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Partnering For Learnware
Case Studies and Critical Success Factors

Canada

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Executive Summary

This report contains case studies and analysis of ten projects in which learnware was developed for workplace training. The purpose of the report is to share best practices and identify critical success factors in the use of learnware to further the appropriate and effective use of technology-based training. Each of the organizations featured in the cases studies has developed sector- or industry-specific training, with lessons applicable to a wider audience. A characteristic shared by all the case studies is reliance on partnerships in the development and delivery of learnware products.

Another element that links these case studies is the (often significant) involvement of Human Resources Sector Councils and industry associations in Canada. Our research shows that these organizations play a pivotal role in the effective adoption of learnware because of the support they provide to companies in their sector, particularly small- and medium-sized enterprises (SMEs). SMEs look to sector councils and professional associations for coordination and leadership to help them access technology-based training. Developers and suppliers also see an important role for councils and associations in aggregating and defining appropriate content for their sectors. Many suppliers feel that the SME market is one of pent-up demand, but its fragmentation makes it hard to serve cost effectively. Post-secondary institutions and private training providers also are looking to councils and associations for leadership in the use of learnware. They are often the delivery arm for sector training programs and are increasingly looking at technology to reduce their costs and expand access to learning.

Analysis of the case studies revealed that six critical success factors are fundamental to successful learnware projects:

◆ partnerships;
◆ learner needs identified;
◆ content with credibility;
◆ sufficient market;
◆ appropriate platform for development and delivery; and
◆ links to accreditation.

PARTNERSHIPS

The ten organizations in the case studies all rely on partnerships, whether in the development or the delivery of their learnware product. In the *production* phase, sector councils, industry associations and educational institutions often provide content knowledge and integration with curriculum. This may be supplemented by company-specific content contributions. In the *distribution* phase, sector councils and associations provide links to the

end user. The developer's distribution networks may be supplemented through distribution arrangements with the education sector. Both sector councils and/or the post-secondary system may provide certification. Financing often comes from a combination of industry contribution and developer investment.

LEARNER NEEDS IDENTIFIED

Learner needs were thoroughly identified by the organizations. Because sector councils are often in the process of establishing occupational skill standards and developing curriculum, the identification of learner needs is an important contribution that these organizations can bring to the table.

Once the learner needs were identified, it was determined that learnware was an effective way to meet those needs. Particularly appropriate functions of CD-ROM and online learning include:

◆ time and site flexibility;

◆ self-pacing;

◆ interactivity;

◆ the ability to dynamically and graphically present concepts;

◆ embedded tracking systems;

◆ search engines;

◆ links to primary documents; and

◆ electronic notes functions.

In each case study, the subject matter lent itself to delivery by learnware because it can be handled on a stand-alone basis and does not require classroom delivery or hands-on use of equipment. However, as shown in some of the case studies, the use of learnware is not without challenges. Examples are given of the special measures being taken to handle weaknesses of the technology for meeting certain needs.

Another important aspect of this critical success factor is the ongoing process of gathering learner feedback and further refining the product based on evaluation findings.

CONTENT WITH CREDIBILITY

In each case, extensive efforts were made to ensure that the content of the learnware was realistic and credible for the target audience. A variety of techniques were used, often based on consultation with steering bodies to facilitate a high level of input from the industry sector. Input usually included consultation with the end user at every stage of the process, including script development and prototype.

This critical success factor is closely connected to another, *links to accreditation* because the acknowledgment of a course through accreditation by an industry or professional organization establishes credibility.

SUFFICIENT MARKET

Particular efforts were made by the organizations in the case studies to create a sufficiently large market to render the use of learnware cost-effective. The case studies illustrate the importance of the following factors in establishing a market of sufficient size.

Marketing strategy emphasizing partnerships: In the case studies, the marketing strategies emphasize partnerships — with community colleges, industry associations or the product developer — to bring the product to market.

Right price point: Organizations are ensuring product affordability by keeping the purchase price as low as possible, or through techniques such as per-usage pricing.

Think big: When the organizations design the learnware, they think in terms of broad markets. The learnware is designed to be sufficiently generic that it does not require modification for each different setting. The content is appropriate for international distribution, for example, with no references exclusive to Canada. In some cases, markets for the product are expanded by targeting educational, as well as industrial, users.

Business drivers stimulating the use of learnware: In the case studies, the following business drivers provided financial and other incentives to encourage sector councils, professional associations or users to adopt training delivery by learnware:

- existing training programs are too expensive or too time consuming;
- there is a requirement to expand accessibility to the training;
- implementation of training brings financial benefits; and
- implementation of training means protection from litigation, or it is required by law.

APPROPRIATE PLATFORM FOR DEVELOPMENT AND DELIVERY

Determining a development and delivery platform appropriate for the target market is one of the biggest hurdles in the use of learnware for the organizations in the case studies. Several have changed their delivery platform over the years, with one group discontinuing the use of CD-I and others dropping CD-ROM in favour of online delivery. Some of the organizations still offer classroom delivery, with delivery by technology as another option. Others use multiple delivery media, for example CD-ROM supported by online tutors, or synchronous and asynchronous online technologies. As the partners in one case study say, one lesson learned is the need to be flexible in the approach to technology. This flexibility has allowed them to change delivery formats as the technology advanced over the four years of the project.

LINKS TO ACCREDITATION

In most of the case studies, the learnware is linked to a degree- or certificate-granting body, and in most cases, has links to broader curriculum. These

links provide motivation for people to pursue training. They are important components in the trend towards learning organizations and the development of industry standards. These links also provide confirmation that the content meets industry needs.

CONCLUSION

When analyzing the critical success factors, it is evident that one factor, partnerships, runs through all the others. As the case studies illustrate, the production and distribution of learnware requires marshalling resources that are not usually resident in any one body. Partnerships with sector councils and industry associations facilitate the identification of learner needs, and these groups may already have curriculum developed to meet those needs.

Developers bring production expertise and distribution knowledge to the partnership. Educational bodies such as universities, community colleges, high schools and private institutions can expand the market. Sector and industry associations can link the product to their own networks connected to the end user. To make the business case viable, partners may be willing to invest their knowledge and expertise against future earnings.

By working together, organizations are bringing learnware to market that otherwise might not have been produced, and providing learning opportunities to people that otherwise might not have access to their benefits.

Introduction

This report contains case studies and analysis of ten projects in which learnware was developed for workplace training. The purpose of the report is to share best practices and identify critical success factors in the use of learnware to further the appropriate and effective use of technology-based training. Each of the organizations in the cases studies has developed sector- or industry-specific training, with lessons applicable to a wider audience. A characteristic shared by all in the case studies is reliance on partnerships in the development and delivery of learnware products.

Another element that links these case studies is the (often significant) involvement of Human Resources Sector Councils and industry associations. These organizations play a pivotal role in the effective adoption of learnware because of the support they provide to companies in their sector, particularly small- and medium-sized enterprises (SMEs). A 1995 study by Green and Stahmer, *The Use of Training Technologies by SMEs*, found that many SMEs like the benefits and flexibility offered by technology-based training (TBT). The most common reasons given for not using TBT is the lack of appropriate learning materials available in technology-based format. SMEs are looking to sector councils and professional associations to provide coordination and leadership in this area.

In the same study, developers and suppliers defined an important role for sector councils and associations in aggregating and defining appropriate learning content to make it more cost-effective for the SME market to use TBT. Many suppliers felt that the SME market for TBT is one of pent-up demand, but it is difficult to serve in a cost-effective manner because of its fragmentation.

Post-secondary institutions and private training providers also play an important role in sector-supported training initiatives, since they are often the delivery arm for such programs. These providers are looking for ways to use technology to deliver training to reduce costs and expand access to materials.

The research found a high level of awareness of learnware's potential among sector councils, industry associations and their partners. However, there is a lack of concrete examples and guidelines to assist these groups in assessing and implementing technology-based training. The purpose of this report is to fill the gap by presenting case studies of successful implementation of learnware, and to analyze the critical success factors that make these projects work.

The purpose of the report is to share best practices and identify critical success factors in the use of learnware to further the appropriate and effective use of technology-based training.

Approach

This report is an expansion of the 1996 report by Green and Stahmer, *Partnering for Learnware: Critical Success Factors in the Use of Learnware by Human Resources Sector Councils and Industry Associations in Canada.* For both reports, we canvassed Human Resources Sector Councils and industry associations to develop case studies about the use of learnware that have broad applicability and lessons to teach outside specific sectors. Our intention was to provide concrete examples and guidelines to assist other organizations in assessing and implementing technology-based training.

In analyzing the case studies, we concluded that six critical success factors are fundamental to successful learnware projects:

1. partnerships;
2. learner needs identified;
3. content with credibility;
4. sufficient market;
5. appropriate platform for development and delivery; and
6. links to accreditation.

Analysis of these critical success factors is contained in the following section. The report concludes with the following ten detailed case studies.

◆ CCH Canadian Limited: professional development for tax/accounting

◆ Canadian Aviation Maintenance Council: training to reduce human errors in aviation maintenance

◆ Canadian Plastics Training Centre: training plastics company employees in the operation of an injection moulding machine

◆ Canadian Professional Logistics Institute: accreditation program for the Professional Logistician (P.Log) designation

◆ Eaton School of Retailing and Ryerson Polytechnic University: Bachelor of Commerce (Retail Management) and a Certificate in Retail and Services Management I and II

◆ Education Program for Software Professionals: a diploma program offered by the University of Waterloo

◆ Forum for International Trade Training: professional curriculum for the practice of international trade

◆ Smart Serve Ontario: a responsible beverage service training program for Ontario servers of alcoholic beverages

◆ Textiles Human Resources Council: textiles training for the textiles workplace

◆ Vicom Multimedia Inc.: industrial health and safety training for sectors such as construction, road building, home building, and manufacturing

Critical Success Factors

PARTNERSHIPS

The organizations in the case studies all rely on partnerships, whether in the development or the delivery of their learnware product. Following are examples of their partnerships.

VICOM MULTIMEDIA INC.

SAFE-T-Disc™ is a line of off-the-shelf and custom-developed products by Vicom Multimedia Inc. for industrial health and safety training. The courseware is on CD-ROM, and the user management system is a centralized database that can be administered on individual computers, over a network, or over the Internet. Vicom developed SAFE-T-Disc™ in consultation with the Alberta Home Builders Association, the Alberta Construction Safety Association (ACSA) in Canada and the American Society of Safety Engineers (ASSE) in the United States.

An interesting partnership model developed by Vicom was to bring the provincial Workers' Compensation Board (WCB) together with its industry sectors to provide the funding for safety training. In Alberta, the WCB worked with the Roadbuilders and Heavy Construction Association to create Roadbuilders Safety Training System (RSTS). The benefit for the WCB is reduction in accidents and claims, with 7,600 Alberta employers sharing $57.5 million in rebates on their 1997 WCB premiums. Although training is only part of the premium rebate, the ACSA and construction owners and companies think Construction Safety Training System (CSTS) made a significant contribution to reduced lost-time claims.

Barry Chugg, vice-president of Vicom, says that the success of its product has relied, and will continue to rely, on partnerships forged with industry and distributors, both in Canada and worldwide. By partnering with industry, Vicom has been able to develop content that meets industry needs, and has gained a global delivery system that connects directly to the end user. Since the product was developed by industry, for industry, it has enjoyed endorsement and buy-in from industry associations.

SMART SERVE ONTARIO

SMART SERVE is a responsible beverage service training program for servers of alcohol in Ontario. The training kit includes a videotape, a facilitator's guide and a workbook. (The CD-I version of the program has been discontinued.) The program was developed by the Hospitality Industry Training Organization of Ontario. The Alcohol and Gaming Commission of Ontario (formerly the Liquor Licence Board of Ontario) was a contributor to content development. Community colleges and other educational institutions offer the program as part of their hospitality training or continuing education programs. Other provinces have expressed an interest in using SMART SERVE.

By partnering with industry, Vicom has been able to develop content that meets industry needs, and has gained a global delivery system that connects directly to the end user.

EATON SCHOOL OF RETAILING AND RYERSON POLYTECHNIC UNIVERSITY

Eaton School of Retailing (ESR) and Ryerson Polytechnic University formed an alliance to develop and deliver the Retail Management Program, a university-level certificate and degree programs for retail managers. To date, the program includes a Bachelor of Commerce (Retail Management) and a Certificate in Retail and Services Management I and II. After experimenting with a variety of formats, including audio and videoconferencing with CD-ROM support, program courses were transferred to an Internet-based distance format.

CCH feels that maximizing strategic alliances and partnerships to produce "win/win" scenarios for the associations, their members and CCH will be a key component of future success.

Other partners in the project include: the Canadian Retail Institute/Retail Council of Canada and individual retailers and suppliers which are helping to build programming and delivery systems; Bell Canada, a strategic partner in the piloting of audio and videoconferencing delivery; and Management Horizons, a division of PricewaterhouseCoopers, which donated access to its retail resources. The Canadian Retail Institute is also launching an industry-wide initiative to develop a Curriculum Development Trust to fund the further development of the program.

CCH CANADIAN LIMITED

CCH Canadian Limited has released over 15 *PD on CD* titles for the tax/accounting marketplace, and discontinued its live seminars. The Institute of Chartered Accountants of British Columbia and Alberta, and the Certified Managerial Accountants of Canada distribute and help promote the product to their membership. Due to the marketplace interest in and acceptance of this medium, CCH has begun to develop alliances and partnerships with associations with vested interest in the professional development needs of their members. CCH feels that maximizing strategic alliances and partnerships to produce "win/win" scenarios for the associations, their members and CCH will be a key component of future success.

CANADIAN AVIATION MAINTENANCE COUNCIL

The Canadian Aviation Maintenance Council (CAMC) is developing a training program to reduce human error in aviation maintenance. The training program is a three-pronged approach developed in partnership with the aviation industry, the Safety System and Services Branch of Transport Canada, and community college training organizations. The (US) Federal Aviation Administration Flight Standards Aircraft Maintenance Division and the (US) Office of Aviation Medicine shared the results of their research programs with CAMC. The research and development behind CAMC's project owes a considerable debt to this international cooperation.

CANADIAN PLASTICS TRAINING CENTRE

The Canadian Plastics Training Centre (CPTC) at Humber College, with Atlantis Aerospace and Husky Injection Molding Systems Ltd., launched a project to develop and test the effectiveness of an interactive CD-ROM-based learning product. The aim of the training is to teach employees of plastics companies the safe start-up, moulding and shut down procedures for an injection moulding machine.

The training product is owned equally by CPTC and Atlantis Aerospace. Revenues will be split 50/50 after the original investment by CPTC and Atlantis is repaid. CPTC will market and distribute the product, and test and certify those people who purchase it.

CPTC itself is a result of a collaborative partnership between Humber College, the Canadian Plastics Industry Association (which represents the plastics processing employers in Canada) and the Ontario Federation of Labour (which represents employees who work in unionized plants in the plastics industry).

EDUCATION PROGRAM FOR SOFTWARE PROFESSIONALS

The objective of the Education Program for Software Professionals (EPSP), offered by the University of Waterloo, is to develop highly trained software professionals capable of developing and maintaining computer-based applications and supporting new strategic products and services. The Software Human Resource Council provided EPSP with a start-up loan, to be repaid over time with payments based on the number of student education days completed. In addition, the Bank of Montreal provided a financial donation to the University of Waterloo. EPSP can be taken in a classroom (at the University of Waterloo or an alliance partner location), at an employer location, or in distance learning format using CD-ROMs and the Internet. EPSP is actively exploring options for Alliance Partners in other countries.

FORUM FOR INTERNATIONAL TRADE TRAINING

The Forum for International Trade Training (FITT) is a private- and public-sector international trade training initiative to foster global expertise among Canadian small- and medium-sized enterprises (SMEs). It aims to establish countrywide standards in the practice of international trade. Founding members include the Alliance of Manufacturers and Exporters Canada, the Canadian Chamber of Commerce, the Canadian Federation of Labour, the Canadian Importers Association Inc., the Canadian Professional Logistics Institute, the Canadian Professional Sales Association and World Trade Centres Canada.

The organization established a professional curriculum for the practice of international trade — the *FITTskills* Program — and developed a number of other programs and workshops delivered across Canada. *FITTskills* in the classroom is delivered through a network of community colleges, universities and private training institutions across the country. FITT is currently developing an electronic delivery mode by converting the eight *FITTskills* modules into Web CT, a structured Web-based, on-line environment combining live instructor-led training with just-in-time, self-paced learning.

TEXTILES HUMAN RESOURCES COUNCIL

The Textiles Human Resources Council, a non-profit, union-management partnership mandated to promote training and education for the Canadian textile industry's employees and managers, launched *Textiles Training Through Technology*. Three initial computer-based training (CBT) programs are in the developmental phase. Hafner Inc., a textile company

in Granby, Quebec, and other Council members have contributed content to the CBT program. In addition, a number of textile companies are donating employee time and resources to assess the prototypes.

The program draws on the curriculum of the Textile Management Internship Program (TMIP), a 12-month educational program designed to create future managers and professionals in the Canadian textile industry, delivered by Mohawk College and McMaster University. The College of Textiles at North Carolina State University worked with the Council to develop 10 of the 13 Textile Technology modules. The CÉGEP de Saint-Hyacinthe released one of its instructors to the program, and provided advice with respect to the textile technology curriculum.

CANADIAN PROFESSIONAL LOGISTICS INSTITUTE

The mandate of the Canadian Professional Logistics Institute is to sustain logistics human resource development, define logistics career opportunities and develop comprehensive training. The Institute developed a certification process for the Professional Logistician (P.Log) designation, currently delivered through interactive, professional development sessions and self-study components. The Institute has launched a project to use distance learning technology to deliver the program, train trainers and create a virtual professional community.

The Institute is pursuing a partnership model in both the development and delivery of its online learning modules. The goal is to create a virtual development space that puts technological tools into the hands of facilitators, and allows them to develop modules for collaborative delivery. To support this approach, the Institute is creating a facilitation program to recruit, select, train and deploy skilled trainers to develop and deliver the program. In addition, the Institute is developing a series of Web sites to expand its network capabilities. With regard to partnerships, President Victor Deyglio says, "The key to our successful use of virtual technology will be inter-organizational networking."

LEARNER NEEDS IDENTIFIED

One of the most important critical success factors to emerge from the case studies is the attention paid to identifying learner needs.

One of the most important critical success factors to emerge from the case studies is the attention paid to identifying learner needs. Identifying learner needs includes:

i.   an analysis of learner needs pre-project, which informs and guides the product development;

ii. verification that a technology-based learning product is appropriate for meeting the identified needs; and

iii. a process to gather learner feedback and further refine the product based on on-going evaluation.

The following examples from the case studies illustrate each of these aspects of identifying learner needs.

i. PRE-PROJECT ANALYSIS OF LEARNER NEEDS

In each case study, learner needs have been thoroughly identified.

◆ In developing SAFE-T-Disc™, Vicom worked with the Alberta Home Builders Association and the Alberta Construction Safety Association to assess learner needs.

◆ For SMART SERVE, a front-end needs analysis was carried out, and the program content was developed based on existing course material and new content from subject matter experts.

◆ As preparation for the development of the Retail Management Program, the Eaton School of Retailing surveyed over 300 people as part of a needs analysis process. Working teams were created in each functional area and employees conducted research with their peers to define their learning needs.

◆ The Canadian Aviation Maintenance Council drew on the findings of international research programs to develop their training program aimed at reducing human error in aviation maintenance. Analysis of learner profiles and needs was conducted through an industry steering committee including air carriers, Transport Canada and the Department of National Defence.

◆ The decision to offer an electronic version of the *FITTskills* Program was supported by research findings from a number of surveys.

◆ The work of the Textiles Human Resources Council (THRC) was informed by research done on the human resource needs of the Canadian textile industry. THRC subsequently commissioned a survey of textile companies which further explored the use of technologies for workplace delivery of training programs.

◆ Survey findings were also important in the development of the Education Program for Software Professionals. In 1995, the University of Waterloo was provided with information from an in-depth survey of a major Canadian corporation in the financial sector that showed that many software professionals had little or no formal information technology (IT) education. In order to upgrade their IT skills, they would require continuous access to product training courses. Additional research determined that a focused, university-level set of Computer Science courses would provide these individuals with a foundation on which to build their professional IT development and significantly reduce their need to participate in technology-specific training. The course content of the learnware distributed on CD-ROM is derived directly from the lecture series counterpart.

◆ The Logistics Institute responded to the findings of the Logistics Labour Market Information study (1997) by reorganizing the content of its core modules and introducing new technology to increase market penetration, meet market demand, and optimize facilitator expertise. The changes in the industry identified by the study led the Institute to see technology as key to reinventing its operational design, organizational structure and market development.

ii. VERIFICATION OF THE USE OF LEARNWARE

An important component of this critical success factor is determining that learnware is the appropriate delivery format for meeting the learner needs. In each of the case studies, the subject matter lends itself to delivery by learnware. In many instances, the material can stand-alone without classroom delivery or hands-on use of equipment. In addition, learnware brings particular advantages, such as tracking systems that follow a student's progress and verify competency achieved. However, in some cases, the use of learnware is not without challenges. Special measures are being taken to handle the weaknesses of the technology in meeting the specific needs of learners. The following examples from the case studies illustrate both the reasons why the use of learnware is appropriate, and the methods for supporting its limitations.

Special measures are being taken to handle the weaknesses of the technology in meeting the specific needs of learners.

CCH Canadian Limited used CD-ROM to replace live seminars, and cites many advantages to using this learnware. The CD-ROM provides self-paced learning, search engines, links to primary documents, electronic notes functions, and time and site flexibility. The CD-ROM also contains archival materials that learners can search for detailed information referred to in the modules.

Eaton School of Retailing and Ryerson were committed from the beginning to making the Retail Management Program available through distance education to enhance access. Their joint vision was to offer world-class retail education on a global scale, using a distance education network accessible by anyone, anywhere, anytime. Currently all courses in Certificate I are delivered via the Internet, and they are supported by a range of electronic communications tools, including e-mail, bulletin boards and Internet Relay Chat (IRC). Additional supportive learning methods include videotapes, audiotapes and audioconferencing.

The Canadian Aviation Maintenance Council (CAMC) found the content of its training material lends itself readily to CBT format, and provides interesting, interactive learning material and case studies in multi-media format. The CBT format captures and maintains the attention of both students and experienced workers. In addition, the CBT approach allows for self-paced learning, and permits distance learning for isolated individuals and those in remote locations. The program has a self-test function that allows the student to go back through the program for self-correction.

CAMC also sees advantages in face-to-face delivery, where a facilitator can work with a small group in a highly interactive training session. To allow for both delivery options, CAMC designed each module to work in a classroom, as well as CD-ROM and Web browser. Through the combined CD-ROM/Web browser approach, CAMC aims to incorporate the interactivity found in a classroom while facilitating accessibility and self-paced learning.

The Canadian Plastics Training Centre (CPTC) is testing the effectiveness of an interactive CD-ROM-based learning product to teach employees a hands-on process — the safe start-up, moulding and shut down procedures for an injection moulding machine — without extensive hands-on practice. To assess the effectiveness of the technology-based

approach, CPTC compared the CD-ROM users with a control group trained using the traditional CPTC approach. The learnware users did not receive any practical training on the operation of the injection moulding machines beyond an initial three-hour orientation. The control group received the traditional four-day CPTC training program on machine operations, including one half-day of classroom instruction and two and one half days of hands-on instruction. The study showed that people trained using interactive learnware could learn the skills needed to operate injection moulding machinery. However, only 35.7 percent of the test group passed the practical hands-on test. In contrast, the control group (trained using traditional hands-on methodology) had a 98 percent success rate. CPTC concluded that interactive learnware can be effective in learning practical injection moulding machine operation skills, however more hands-on instruction prior to testing is necessary.

The Forum for International Trade Training (FITT) found that many owners and senior managers of medium-sized enterprises do not attend *FITTskills* courses offered in the colleges and universities across Canada, mainly because of the time constraints associated with managing a business. Forty-five percent of the respondents were interested in a practical "hands-on," "how-to" approach to learning, which could be acquired independently of time or place. By using electronic delivery, FITT can reach a geographically dispersed audience, provide flexibility to accommodate different learning styles, and offer more training to more people on more subjects with higher impact and effectiveness. One of the benefits of FITT's electronic delivery is that individuals not able or willing to enroll with a delivery partner can access *FITTskills*. Also, FITT is able to respond to the needs of major corporations that require delivery with special timing.

In order to ensure that the technology is being used effectively, FITT instructors delivering the electronic format have participated in an onsite or online train-the-trainer session, or have received instructor information on how to get the best results using an electronic delivery format. FITT has established guidelines for system development and delivery in order to make the system user-friendly and maximize interaction. As Caroline Tompkins, FITT's general manager explains, "The biggest challenge with online courses is encouraging interactivity among the participants, and between participant and instructor."

The Textiles Human Resources Council commissioned a survey to assess whether a computer-based multimedia format was an appropriate medium for the delivery of technical textile training in the workplace. According to the survey, companies considered the strongest benefit of computer-based training to be its flexibility in fitting into the operations schedule. Training could be offered during slow production periods, during an employee's "off-shift," or when a line "goes down" for technical reasons. Computer-based training also allows companies to provide standardized content, ensuring that people on different shifts all received the same training. It also allows independent learning for people uncomfortable in a classroom environment. One company felt computer-based training could help meet the training needs of a hearing-impaired

"The biggest challenge with online courses is encouraging interactivity among the participants, and between participant and instructor."

employee. Companies also emphasized the following features as being appropriate for their learner population:

- ◆ the potential for the trainees to proceed at their own pace and repeat the material as often as needed;
- ◆ the capacity for highly visual instruction (low reliance on text);
- ◆ the capacity to provide the training in varying degrees of complexity and mastery (from simple to advanced); and
- ◆ the potential for providing training in other languages.

Although all the interviewees wanted to see computer-based delivery, almost everyone recommended that it be combined with some form of group support. They stressed the need for support because their employees would neither be familiar nor comfortable with a purely self-directed learning approach. Also, they wanted to build-in a way for employees to interact with the instructors and the material.

Vicom's SAFE-T-Disc™ line of products is designed to provide safety training to people working in the "blue collar" aspects of construction, manufacturing and transportation. The CD-ROM format allows learners to set their own pace through courseware based on their skill level. Research results found that students who tended to get lower scores in the classroom uniformly scored higher using SAFE-T-Disc™. Because learners can proceed at their own pace, they can achieve 100 percent mastery of the subject material, a critically important factor when dealing with safety training.

Because learners can proceed at their own pace, they can achieve 100 percent mastery of the subject material, a critically important factor when dealing with safety training.

The Logistics Institute identified a number of challenges in its proposed use of online development and delivery. Given that the key characteristic of the P.Log professional program is interactivity, the greatest challenge is to capture the values of group-based, interactive learning when using technology for distance delivery. To achieve this, the Logistics institute intends to combine both synchronous technologies (i.e., interactive discussions through the use of chat sessions and net meetings) and asynchronous technologies (i.e., e-mail, threaded discussions, news-groups, mailing lists, knowledge bases). The challenge for facilitators will be to learn how to use the virtual learning space infrastructure to motivate, energize and effectively deliver on-line instruction. The Institute has established guidelines to ensure awareness of these challenges.

The approach taken by the Education Program for Software Professionals is to combine CD-ROMs with live tutors. Each CD-ROM's presentation, structure and format is designed to provide a comprehensive, self-study system. For example, students can navigate their way through the first course, Modern Programming Methods (MPM), which contains more than 150 distinct concepts, using features such as a course road map, self-assessment quizzes, animated graphics and a course comprehension grid. In addition, each student has access via e-mail to a tutor who will answer course-related questions, and provide additional assignments in preparation for the final exam.

iii. EVALUATION PROCESS

Of the ten learnware projects featured in the case studies, some are in operational mode and others are still at the prototype stage. In each case, the learnware was put through (or will be put through) beta testing and prototyping. Following are evaluation examples from the case studies. (The Canadian Plastics Training Centre beta test was described above.)

The Textiles Human Resources Council will pilot its CBT programs with five of the Council's member companies. The pilot projects will serve multiple purposes including:

◆ evaluating CD-ROM and Web-based distribution methods (including synchronous and asynchronous environments, support materials, and trainers/coaches);

◆ evaluating company buy-in at all levels;

◆ determining potential return on investment; and

◆ defining the selling price of the CBT programs.

The learnware product needs to have credibility for both the employer and the learner.

To ensure product quality, each CD-ROM version of the Education Program for Software Professionals (EPSP) is beta tested with a group of students. The feedback obtained from the test group is incorporated into the final version. In response to client feedback to the first prototype CD-ROM, EPSP developed two new software products and incorporated them into the training program. The products are Study Mate, which incorporates self-testing procedures and records progress and Communications Cop, which manages communications between the students and the tutors.

For EPSP, students provide evaluation of the learnware during and at the completion of the course. This information is used to update future versions. Similarly, for *FITTskills* Online, both participants and instructors fill out evaluation forms. SAFE-T-Disc™ has been validated by tens of thousands of clients across North America and in two independent studies, including a two-year Ph.D. project comparing classroom training to SAFE-T-Disc™, and a labor organization's field test of more than 500 workers.

To research the transfer of knowledge from the Retail Management Program to the workplace, the Centre for Research on Lifelong Learning carried out a study called "Getting the Most Out of Learning." The goal of the research was to help companies measure their return on investment and make better use of what their people learned. The Centre used the study data to develop support for the courses. A resource guide is available on the Web site with tips for students and managers. In addition, the program received a grant from the Office of Learning Technologies to develop a tool kit to identify techniques for testing and evaluating distance education courses.

CONTENT WITH CREDIBILITY

Content with credibility is a critical success factor that deserves special emphasis. The learnware product needs to have credibility for both the employer and the learner. Both parties need to feel that the product speaks

The fact that the product was developed or endorsed by a sector council or industry association is significant in establishing credibility.

to their specific environment and that the learning gained will be applicable to their workplace situation. The fact that the product was developed or endorsed by a sector council or industry association is significant in establishing this credibility.

Through the development process, all of the organizations in the case studies made extensive efforts to ensure that the content of the learnware product was realistic and credible for its target audience.

The Eaton School of Retailing and Ryerson Polytechnic University cite steering structures as a critical success factor of their project. The retail sector as a whole participated in the development and delivery of the Retail Management Program through a sectoral steering committee and five subcommittees established under the IAS Initiative in Retail Management Education (National Sector Adjustment Service, Human Resources Development Canada). In addition to these committees, an internal Program Advisory Committee at Ryerson has both industry and Ryerson representation.

The partners say that the strength of the design and implementation of their project has been in the combination of university and corporate partners designing the program from the ground up. Ryerson's contribution meant credibility in terms of developing a well-designed, accredited learning program. The steering structures, with their high level of consultation with the retail sector in areas such as curriculum development, gave the program high credibility with the end user looking for applied learning.

In the case of SMART SERVE, Smart Serve Ontario emphasizes that the creative approach used in the program has a lot to do with the end user's acceptance level. For this project, the developer needed a good practical understanding of the broad nature of the hospitality industry, its employees and customers.

The CCH Canadian Limited product *PD on CD* is based on the knowledge of two of Canada's leading experts in the field of tax planning, and experience acquired from CCH's live seminars. Likewise, all SAFE-T-Disc™ products were developed with industry experts. The *FITTskills* courses are compiled, developed and taught by international trade practitioners who are experts in their field.

Thirty members of the Textiles Human Resources Council, as well as educational partners and multimedia companies, are participating in the beta testing of the initial *Textiles Training Through Technology* CBT programs. Through this process, the Council wants to ensure that the CBT programs will appeal to the entire Canadian textile industry, suppliers and related stakeholders.

Content with credibility is closely connected to another critical success factor, *links to accreditation* (see below). When an industry or professional organization acknowledges a product by connecting its use with accreditation, credibility is often ensured.

SUFFICIENT MARKET

For each of the learnware projects, particular efforts are being made to create a sufficiently large market to render the use of learnware cost-effective. The case studies illustrate the importance of the following factors in establishing a market of sufficient size:

i.   marketing strategy emphasizing partnerships;

ii. right price point;

iii. think big; and

iv. business drivers.

i. MARKETING STRATEGY EMPHASIZING PARTNERSHIPS

In each case study, the marketing strategy emphasizes partnerships — with educational institutions, industry associations or the product developer involved in bringing the product to market.

The Institute of Chartered Accountants of British Columbia and Alberta, and the Certified Managerial Accountants of Canada distribute and help promote the professional development CD-ROMs *PD on CD* to their membership. For CCH Canadian Limited, an important aspect of this delivery mode is that it fosters cooperation with professional associations that have vested interest in the professional development of their members. In the past, CCH activities may have competed with these same organizations.

Individual licensed establishments purchase SMART SERVE directly. In addition, community colleges and other educational institutions are offering the program as part of hospitality training or continuing education programs. Smart Serve Ontario's marketing efforts are supported by the promotional efforts of the Alcohol and Gaming Commission of Ontario and the insurance companies that would like to see people receive this training. The marketing is made easier because SMART SERVE is the only beverage server training program available, and some of the training is mandatory.

The Canadian Plastics Training Centre (CPTC) CD-ROM training product is owned equally by CPTC and Atlantis Aerospace. CPTC will market and distribute the product, and revenues will be split 50/50 after the original investment by CPTC and Atlantis is repaid. CPTC will test and certify those people who purchase the product.

The Education Program for Software Professionals (EPSP) has developed relationships with colleges, universities and private training organizations in Canada and abroad with the intention that they should deliver the program. These organizations are called alliance partners. The Canadian alliance partners instrumental in helping the University of Waterloo deliver EPSP include: Technical University of British Columbia, University of Regina, Conestoga College, Humber College, CDI Corporate Education, University of New Brunswick, and Keltic Learning Centers.

In each case study, the marketing strategy emphasizes partnerships — with educational institutions, industry associations or the product developer involved in bringing the product to market.

ii. RIGHT PRICE POINT

Smart Serve Ontario feels that one of the challenges of SMART SERVE is to keep the program affordable and acceptable to all. A training kit costs $129 ($104 for hospitality organizations that are members of Smart Serve Ontario, a division of the Hospitality Industry Training Organization of Ontario). The kit includes the training program on videotape, a facilitator's guide and a workbook. Individual certification kits cost $18 ($13 for hospitality organizations that are members of Smart Serve Ontario). This price includes a workbook, a test, processing the test and issuing certificates and pins to successful participants (or one retake test if a passing mark of 80 percent is not achieved). Many users say they would never have taken beverage server training if it had not been so accessible and low in cost.

When the organizations design their learnware they are thinking of broad markets.

Companies purchase SAFE-T-Disc™ on the basis of per-head learning contracts for the number of people they train. Purchasers receive courseware discs for the given number of learners and workstations, and User Management System (UMS) discs for the given number of servers or workstations, if they are not running the Internet version.

CCH Canadian Limited is selling *PD on CD* for between $95 and $295. According to CCH, this approach is less expensive for users than the live seminars because the seminars incurred costs in terms of travel and time away from work, and were more time consuming because they were not responsive to the varying learning curves of participants.

The Canadian Aviation Maintenance Council (CAMC) intends to modestly price its training program aimed at reducing human error in aviation maintenance activities. The price will be calculated to cover the cost of production, with a small royalty to CAMC and its partners. The cost of development was covered by the initial contribution from HRDC, which was matched by industry.

The Education Program for Software Professionals (EPSP) believes that one of the reasons for the success of its product is the price point, which is well positioned with respect to other commercial IT course offerings. According to the Hitech Career Journal, the EPSP student fee of $365 per day is less than the cost of most technology courses in the marketplace.

iii. THINK BIG

When the organizations design their learnware they are thinking of broad markets.

One of Vicom's SAFE-T-Disc™ products, the Construction Safety Training System (CSTS), was developed with versions for both the Canadian and the American marketplaces. The market reach has been expanded through the use of The Reading Machine which ensures that lower-literacy or English-as-a-second-language learners will not be disadvantaged during the learning process.

The Logistics Institute online courseware will be used within its own certification process. In addition, the Institute is developing a market in high schools, and developing ties with a number of international organizations, including one in Argentina.

The Canadian Aviation Maintenance Council (CAMC) designed a broad-based learning product for which it envisions a sizable market. The target market is the employee conducting aviation maintenance, but the program is also relevant for those working in all areas of aviation maintenance and related activities. The program has applicability for all levels — from technicians performing hands-on activity to senior management. The potential market includes all large and small air carriers, large and small repair and overhaul agencies, some airframe and component manufacturers and a number of related industries. In addition, the program has worldwide potential, with the USA and the UK already expressing interest in the program.

The Canadian Plastics Training Centre (CPTC) chose injection moulding for its learnware pilot project because it represents 65 percent of the jobs in the plastics processing industry. The CD-ROM topics of machine start up and shut down are fundamental skills required for all machine operators and set-up technicians, and therefore have broad applicability in the workforce. However, the product will require further refinement to have market applicability, and CPTC and Atlantis are still determining their next step. The original intent was to develop further modules and offer them as part of a larger certification program. However, the product development costs were high and the partners are evaluating the feasibility of further development.

The Education Program for Software Professionals is actively exploring market expansion by establishing alliance partners in other countries. Denmark has requested status as an alliance partner, and inquiries have been received from Japan, the UK, India and Singapore.

The Textile Human Resources Council is developing a market for its CBT products by combining generic core material with the capacity to customize the product to suit specific requirements. With this approach, a company could develop a customized training program at a lower cost than if it developed the training independently.

The population targeted by the Retail Management Program is retail professionals world wide: the program is available to anyone with access to the Web. In addition to Canada, current registrants are located in the USA and Brazil. A partnership has been established with a retail council in Belo Horizonte, Brazil, that includes translating all 13 modules into Spanish and Portuguese.

In the case studies, certain business drivers provided incentives for technology solutions, and encouraged users to adopt training by learnware.

iv. BUSINESS DRIVERS STIMULATING THE USE OF LEARNWARE

In the case studies, certain business drivers provided incentives for technology solutions, and encouraged users to adopt training by learnware. These drivers include:

◆ existing training programs that are too expensive or time consuming;

◆ a requirement to expand accessibility;

◆ implementation of training brings financial benefits; and

◆ implementation of training means protection from litigation, or it is required by law.

Examples of these business drivers from the case studies are provided below.

Existing training programs are too expensive or time consuming

In the case of SMART SERVE, a previous classroom-based training program took five and a half hours to complete, and cost $30 to $75 per person. Given that the industry has a turnover rate of 30 to 80 percent, the program took too long to deliver, was cost-prohibitive and not sufficiently accessible. As a result, the industry examined other options that would be less costly, reduce training time and be more accessible. The impetus was accelerated when a rumour circulated that the Ontario government was considering making the training mandatory. This was a major incentive to re-examine the approach to delivery of the program.

CCH Canadian Limited moved its professional development delivery for the tax/accounting marketplace to technology-based learning, and discontinued its live seminar-based training. CCH concluded that live seminars were costly in terms of travel and time away from work, and were not responsive to the varying learning curves of participants. In contrast, the CD-ROM-based training provides self-paced learning and time and site flexibility.

The CD-ROM product developed by the Canadian Plastics Training Centre (CPTC) was based on two modules of an existing CPTC training program, machine start up and shut down. The traditional training for these skills is either performed on the job — usually inadequately — or at a training centre such as the CPTC, where the costs are prohibitive for an individual who may be paid less than $10 per hour for these skills.

Requirement to expand accessibility

IT is changing so rapidly that it is difficult for software professionals, many of whom learned on the job, to retain leading-edge competency while maintaining and developing computer-based applications. Prior to the introduction of the Education Program for Software Professionals (EPSP), this type of education was only available through full-time computer science degree programs offered at universities. Only a few universities offer part-time Computer Science courses. The University of Waterloo recognized that most working software professionals could not access Computer Science programs at universities because of location or economic or scheduling constraints. To meet the need, EPSP developed part-time, in-class courses with distance education versions available on CD-ROM.

FITT estimates a 20 percent increase in *FITTskills* total enrollment as a result of introducing the electronic option. Potential purchasers are profiled as busy professionals with significant demands on their time, who seek "just-in-time" delivery of materials relevant to their work and industry. Many individuals find the option of completing a course of study while maintaining business and personal timetables to be attractive. In some cases, individuals have not been able to complete their Certified International Trade Professional requirements using traditional delivery.

Given that the industry has a turnover rate of 30 to 80 percent, the program took too long to deliver, was cost-prohibitive and not sufficiently accessible.

Prior to SMART SERVE, instructors taught the course in licensed establishments, or set up training sites in more populated areas.

In the case of the retail merchandising program, the Eaton School of Retailing and Ryerson were committed from the start to make the program available through distance education in order not to restrict access. The online courses give users flexibility of scheduling and expand accessibility beyond the urban centres.

Implementation of training brings financial benefits

Technology-supported training often provides the validation to support return-on-investment calculations, particularly in technical areas where concrete improvements can be justified and measured. Vicom has evidence to show that SAFE-T-Disc™ contributed to a measurable reduction in lost-time claims. It estimates that safety and health programs save $4 to $6 for every $1 invested. Injuries and illnesses decline, workers' compensation costs go down and medical costs decrease. There are other, less quantifiable, benefits as well: reduced absenteeism, lower turnover, higher productivity and increased employee morale. Most importantly, knowledgeable employees reduce costly incidences and accidents.

Implementation of training means protection from litigation, or is required by law

Learnware can support remediation, testing and validation activities, and can ensure 100 percent mastery. This is essential with mandated or compliance training such as SMART SERVE and SAFE-T-Disc™, and is highly desirable for other types of training. SAFE-T-Disc™ provides the information required by health and safety administrators and insurance organizations by tracking and documenting employee training dates, completion times, content covered and results.

In the case of SMART SERVE, the Alcohol and Gaming Commission of Ontario requires the server training program for new licence applications, transfers, disciplinary cases, catering endorsements and golf course endorsements. Also, the Municipal Alcohol Policy in place in many municipalities throughout Ontario requires that anyone holding an event on their property must have the volunteers and/or staff trained by SMART SERVE.

APPROPRIATE PLATFORM FOR DEVELOPMENT AND DELIVERY

Determining a development and delivery platform appropriate for the target market is one of the biggest learnware hurdles.

In the case of SMART SERVE, a front-end needs analysis concluded that the training program should be delivered on video and CD-I. Smart Serve offered CD-I players for sale at the same discounted price they received from Philips ($650 or $850, depending on the model). However, it was found that the vast majority of the purchasers were using video. "Most of the licensed establishments already have VCRs and do not find sufficient added value to justify purchasing a CD-I player. However, we have had a lot of interest expressed in a CD-ROM version." As a result, the CD-I was

Determining a development and delivery platform appropriate for the target market is one of the biggest learnware hurdles.

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The partners in the Retail Management Program stress that one of the lessons they learned is the need to be flexible in the approach to technology. This flexibility allowed them to change delivery formats as the technology advanced over the four years of the project.

dropped from the training package. Long-term plans include producing a CD-ROM version, and developing on-line Internet-based training.

In 1996, the Logistics Institute developed a prototype CD-ROM, designed as a logistics system simulation to develop logistical skills. At the time, CD-ROM was considered an ideal medium for the Institute's training because of its interactivity and suitability for skills development. The intention was to use the CD-ROM in the Institute's certification process to replace and supplement some of the simulation training done through group-based or board-based games. The product was also intended for broader markets, including high schools. After piloting the prototype, the Institute found the gap between further development and roll-out costs and the potential return on investment was too wide. As a result, the project was dropped. The Institute's new approach will use online learning to incorporate interactivity and achieve learning outcomes.

The Retail Management Program's original plan was to use a CD-ROM as a source of ongoing revenue. It would be sold as a "textbook" for university and high school curricula, and as a stand-alone learning tool for North American retailers. This approach proved unfeasible because there was no infrastructure (i.e., not enough CD-ROM players) in place to create a trade market for the CD-ROM. After experimenting with a variety of formats, including audio and videoconferencing coupled with CD-ROM support, all courses were transferred to an Internet-based distance-learning format. The partners in the Retail Management Program stress that one of the lessons they learned is the need to be flexible in the approach to technology. This flexibility allowed them to change delivery formats as the technology advanced over the four years of the project.

The Education Program for Software Professionals chose CD-ROM as its delivery platform because it allows students to work at local desktop computer speeds without constantly being on-line with a service provider. However, the long-range plan is to move to the on-line delivery of all courses. The distance delivery version is being created in HTML to facilitate easy transfer to the on-line mode. In the short term, updated versions of the CD-ROM will be released as warranted.

The survey conducted for the Textile Human Resources Council showed that limited access to appropriate technology did not appear to be a barrier to the implementation of computer-based training in textile workplaces. All interviewees said that their employees would be able to access computers at work in order to take CBT technical training programs. The survey emphasized, however, the importance of combining computer-based delivery with some form of group support. The companies felt that their employees would neither be familiar nor comfortable with a purely self-directed learning approach; they wanted to build in a way for employees to interact with the instructors and the material.

SAFE-T-Disc™ courses are CD-ROM based. This platform allows for delivery of the training on job sites, in mobile trailers and in learning centres.

The Forum for International Trade Training established a number of critical success guidelines for their online courses to ensure that the platform would be appropriate for the end user. The courses should have

a user friendly system that is easy for people with basic computer skills to operate. They should be supported on both PC- (Windows) and Mac-based systems. Ideally, a user should be able to use the system with a minimal hardware platform. Due to participants' schedules and concerns about time zones, the system should support both asynchronous and synchronous use. Also, participants should be able to work off line as needed, and be able to connect to the system to update e-mail files and other material.

The Logistics Institute needed a platform that would allow it to pursue a partnership model both in the development and in the delivery of its online learning modules. The goal is to create a virtual development space that puts technological tools into the hands of facilitators, and allows them to develop modules for collaborative delivery. Each of the Institute's online modules will be a self-contained learning environment seeded with content. Facilitators will select and customize module content in line with a generic module template. To support this approach, the Institute is creating a facilitation program to recruit, select, train and deploy skilled trainers to develop/deliver the program.

In most of the studied cases, learnware has links to a degree- or certificate-granting body, usually with links to broader curriculum.

LINKS TO ACCREDITATION

In most of the studied cases, learnware has links to a degree- or certificate-granting body, usually with links to broader curriculum. These links, which motivate people to pursue training, are important components in the trend towards learning organizations, as well as the development of industry standards. These links also provide confirmation that the content meets industry and employee needs.

Certification is essential when the training program is mandatory or part of compliance training. In the case of SMART SERVE, learners must take a written test provided in the training kit and return it to Smart Serve Ontario. Smart Serve Ontario processes the test and awards successful applicants certification on a wallet-sized card. Certification records are retained in Smart Serve Ontario's database and replacement cards can be issued. Smart Serve Ontario also handles the certification for the SMART SERVE portion of community college courses across Ontario.

SAFE-T-Disc™'s Construction Safety Training System (CSTS)-Canada contains content accepted as the training standard in Alberta, and which is being used in Saskatchewan and the Maritimes. In Alberta, the Alberta Construction Safety Association provides certification cards required to work on job sites throughout Alberta. CSTS-US covers material required by the US Occupational Safety and Health Administration's ten-hour program certification. Vicom's long-term plan is to provide centralized record management over the Internet to simplify and streamline due diligence and recertification.

The Logistics Institute developed a certification process for the Professional Logistician (P.Log) designation. All its online modules are qualifying components for P.Log designation.

The CD-ROM program developed by the Canadian Plastics Training Centre covers two modules of a training course that are part of a CPTC certification program on injection moulding.

The Retail Management Program includes a Bachelor of Commerce (Retail Management) and a Certificate in Retail and Services Management I and II. The certificate program also serves as a building block for the B.Com.

Successful completion of the eight courses in *FITTskills* leads to a Diploma of International Trade from FITT and satisfies the basic educational requirement for the CITP (Certified International Trade Professional) designation.

The University of Waterloo awards a certificate for passing each course in the Education Program for Software Professionals. A diploma is awarded when all six courses have been successfully completed. Upon obtaining the EPSP diploma, credits can be applied toward a University of Waterloo Computer Science degree. The Canadian Information Processing Society (CIPS) recognizes EPSP as providing enough education credits for any of their members to recertify their Independent Study Program (ISP) status.

EPSP views accreditation as an important aspect of its program. By controlling the accreditation process, EPSP retains control of course content and testing, and is able to maintain the integrity and quality of the program. All learner testing is through proctored examinations, which are prepared and marked by the University of Waterloo. Students write the examination at local established University of Waterloo examination sites, both in Canada and abroad. This means the student is assured that all methods of taking the course have the same value, and all result in the same diploma.

Conclusion

When analyzing the critical success factors, it is evident that one factor, *partnerships*, runs throughout all the others. As the case studies illustrate, the production and distribution of learnware requires marshalling resources that are not usually resident in any one body. Partnerships with sector councils and industry associations can facilitate the identification of learner needs, and these groups may already have curriculum developed to support those needs.

Developers bring production expertise and distribution knowledge to the partnership. Educational bodies, such as universities, community colleges, high schools and private institutions, can expand the market. Sector and industry associations can link the product to their networks connected to the users. To make the business case viable, partners may be willing to invest their knowledge and expertise against future earnings.

By working together, organizations can bring learnware to market that otherwise might not have been produced, and provide learning opportunities to people that otherwise might not have access to their benefits.

Case Studies

Case Study 1:

CCH CANADIAN LIMITED

A. DESCRIPTION OF LEARNING PRODUCT/SERVICES

CCH Canadian Limited has changed its professional development delivery for accounting from live seminars to technology-based learning. To date, over 15 *PD on CD* titles have been released, directed almost exclusively to the tax/accounting marketplace. The first *PD on CD*, released in late 1994, saw the seminar "Year End Tax Planning" become an interactive CD-ROM. The course consists of eight training modules for Windows that include sessions on capital gains planning, shareholder loans and incorporating investments. A course presenter anchors the course. The CD-ROM contains archival materials that learners can search for detailed information referred to in the modules.

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B. IDENTIFICATION OF THE LEARNING NEED

As a way to improve their knowledge base and keep current in their field, tax and accounting professionals attend CCH seminars. However, the seminar style of information presentation has drawbacks for learners.

These include:

◆ ability to attend;

◆ high costs in terms of travel and time away from work; and

◆ non-responsiveness to the varying learning curves of participants.

CCH sought to provide the same seminar content in a more cost-efficient and user-friendly format using learnware.

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE TO MEET THIS NEED

PD on CD content is based on the knowledge of two of Canada's leading experts in the field of tax planning, and on experience from the live seminars. It provides the information tax and accounting professionals are seeking.

Learnware, as opposed to live seminars, provides self-paced learning. It does not require professionals to leave work or incur travel costs. The learnware also offers search engines, links to primary documents, electronic notes functions, and time and site flexibility.

D. DESCRIPTION OF MARKET

PD on CD is priced between $95 and $295. The Institute of Chartered Accountants of British Columbia, The Institute of Chartered Accountants of Alberta, and the Certified Managerial Accountants of Canada distribute

and help promote the product to their membership. An important factor from a business perspective is that the new delivery mode fosters cooperation with professional associations that have vested interest in the professional development of their members. In the past, CCH activities may have competed with these same organizations.

E. RESPONSIBILITIES AND FUNDING

In-form Interactive is the developer of the CD-ROM. CCH paid for the development of *PD on CD* as a commercial product.

F. LINKS TO ACCREDITATION

There are no links to accreditation.

### G. ON-GOING COSTS/FUNDING

CCH funded the production and is handling the product's promotion. Distribution support is provided by the professional associations as described above.

H. LONG-TERM PLANS

CCH has released over 15 *PD on CD* titles directed almost exclusively at the tax/ accounting marketplace, and discontinued its live seminars. Due to the marketplace's interest in and acceptance of this medium, CCH has begun to develop alliances and partnerships with associations with vested interest in the professional development needs of their members, for example, the Institute of Chartered Accountants of British Columbia and Alberta, Certified General Accountants of Ontario, Alberta Agriculture, and the Certified Managerial Accountants of Canada. CCH feels that maximizing strategic alliances and partnerships to produce "win/win" scenarios for the associations, their members and CCH Canadian Limited will be a key component to success.

I. ASSESSMENT OF PROJECT

The *PD on CD* project was successful in introducing a new learning medium in the marketplace.
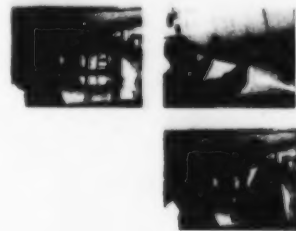
Case Study 2:

CANADIAN AVIATION MAINTENANCE COUNCIL

A. DESCRIPTION OF THE LEARNING PRODUCT

The Canadian Aviation Maintenance Council (CAMC) is a not-for-profit organization established in 1992 to assist with human resources recruitment and training for the Canadian aviation maintenance industry. One of CAMC's goals is to develop occupational standards and establish national basic training standards for the technical trades associated with aviation maintenance. A core requirement of this basic training includes human factors safety training. CAMC is currently developing a training program aimed at reducing human error in aviation maintenance activities. The training program is a three-pronged approach in partnership with the aviation industry, the Safety System and Services Branch of Transport Canada, and community college training organizations.

The program is divided into three modules.

1. The first is aimed at the student in a basic aviation maintenance training course, prior to entering the industry.

2. The second is an awareness session with technicians and supervisors in industry.

3. The third is a company program to train management in methods of a) analyzing the root causes of human error in maintenance activities, b) implementing corrective action, and c) establishing a follow-up system to eliminate or reduce similar errors.

Each module can be instructor-led or used in a CD-ROM/Web browser format. CAMC sees advantages in face-to-face delivery, where a facilitator can work with a small group to deliver a highly interactive training session. However, through the combined CD-ROM/ Web browser format, CAMC aimed to incorporate interactivity and facilitate accessibility and self-paced learning. The learnware is stand-alone, supported by a user instruction guide. The three modules are independent of each other, but form a natural sequence of corrective action.

As of June 1999, the first two modules were completed. The third is in final design development. All modules will be available in English and French.

B. IDENTIFICATION OF LEARNING NEEDS

The aviation industry estimates that between six and 25 percent of aircraft accidents and incidents are attributable to maintenance errors. The cause of these errors may be traced to human factors such as poor judgment or

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failure to follow procedure. These errors may be the result of distractions at critical moments in maintenance activities. The results are equipment malfunction or failure, injury, or death. The attendant result is higher costs in terms of human and other resources.

Although there has been much attention paid to flight crew training and crew resource management in human factors affecting crew performance, the errors attributed to human failures by maintenance personnel have not been adequately addressed.

The Federal Aviation Administration Flight Standards Aircraft Maintenance Division and the Office of Aviation Medicine have established research programs on human factors in aviation maintenance. These organizations shared the results of their work with CAMC, and the research and development behind CAMC's project owes a considerable debt to this international cooperation. CAMC, the aviation maintenance industry and Transport Canada concluded that there was great value in producing a national coordinated program in Canada offering a viable, effective training program to reduce and control this problem.

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE TO MEET THIS NEED

The content of the training material lends itself readily to CBT format and provides interesting, interactive ning and case studies in multi-media format. The CBT format captures and keeps the attention of both students and experienced workers. In addition, the CBT approach allows for self-paced learning and offers distance learning to individuals in remote or isolated locations. The program has a self-test function that allows the student to go back through the program for self-correction.

D. DESCRIPTION OF MARKET

The target market is the employee conducting aviation maintenance, but the program is also relevant for those working in all segments of aviation maintenance and related activities. The program has applicability for all levels — from technicians performing hands-on activity to senior management. The potential market includes all large and small air carriers, large and small repair and overhaul agencies, some airframe and component manufacturers and a number of related industries.

The program is not only relevant to Canada, it has worldwide potential. (The USA and the UK have already expressed interest in the program.) Human error in aviation maintenance has been the subject of many international conferences and regulatory symposia. By initiating this corrective-action program, CAMC has taken the lead in providing an effective solution. It is anticipated that there will be considerable demand for the program, which combines the CBT's flexibility and self-paced learning with a recurrent training element. With the right marketing and sales program, CAMC envisions a sizable market.

E. RESPONSIBILITIES AND FUNDING

Initial funding of over $100,000 was provided by Human Resources Development Canada (HRDC), and was matched by in-kind and cash contribution from industry partners.

Learner and needs profiles were established by an industry steering committee including air carriers, Transport Canada and the Department of National Defence. Information was obtained from the Federal Aviation Administration Medical Center, and through international collaborative studies (for example, http://www.hfskyway.com).

CAMC developed program content using resources such as Transport Canada Workshops and international studies. A Statement of Work was developed for the design and the development of each module, and a Request for Proposal was issued. Mecca Media Group of Edmonton is the contractor for modules 1 and 3. The Group for Advanced Information Technology at the British Columbia Institute of Technology is the contractor for module 2. The steering committee approved each stage of development.

Contractual agreements will be established with the contractors for the reproduction, marketing and sales of the final products. Delivery of the system material is provided through the sale of the CD-ROM and security access code to the Web browser site. Administration of the program, sales and marketing agreements, and access codes will be undertaken by CAMC.

F. LINKS TO ACCREDITATION

CAMC has an accreditation policy and procedures for its basic technical training curricula, however, accreditation will not apply to this basic program. The program is perceived as a self-learning exercise, in which the real test will be individual and collective performance in the workplace. The program establishes criteria for measuring the corrective action and provides feedback for the effectiveness of the program. Transport Canada monitors overall company performance in this regard.

G. ON-GOING COSTS/FUNDING

Funding to maintain and update the program is expected to come from the sale of the product, or from industry participation as corporate members of CAMC. The product will be modestly priced, calculated to cover the cost of production, with a small royalty to CAMC and its partners. The cost of development was covered by the initial funding from HRDC, coupled with the matching contributions from industry.

H. LONG-TERM PLANS

CAMC intends to develop the program further based on industry experience and use. In addition, it intends to develop on-going maintenance management training for technicians and Approved Maintenance Engineers who aspire to senior management positions.

I. ASSESSMENT OF PROJECT

Since the product is untried in industry, it is too early to predict its overall success. The product is anticipated to be available in July 1999 for modules 1 and 2, and in September 1999 for module 3.

Beta testing with students who just graduated from an aviation basic technical training program found that students were impressed with the quality of the content and the medium of delivery.

Jim Riddoch, project manager, concludes, "Any organization can impose its own standard of evaluation on this program. However, the true measure will be based on results and effective reduction of human errors in the workplace."

Case Study 3:

CANADIAN PLASTICS TRAINING CENTRE

A. DESCRIPTION OF THE LEARNING PRODUCT/SERVICES

In July 1996, the Canadian Plastics Training Centre (CPTC) at Humber College, together with Atlantis Aerospace and Husky Injection Molding Systems Ltd., launched a project to develop and test the effectiveness of an interactive CD-ROM-based learning product. CPTC's goal was to eliminate more than 80 percent of the practical training it currently provides by using alternate learning methods.

The CPTC and its partners developed an eight-hour interactive learnware course that combines generic injection moulding machine functionality with the specifics of the Husky machine controller. The aim was to teach employees of plastics companies the safe start-up, moulding and shut-down procedures for an injection moulding machine.

B. IDENTIFICATION OF LEARNING NEED

The CD-ROM product was based on two modules of an existing CPTC training program, Machine Start Up and Shut Down. The CPTC chose these two modules for two reasons. First, they are inherently hands-on in nature. Students must demonstrate their practical understanding of the skills required to perform the functions of machine start up and shut down. Second, machine start up and shut down are fundamental skills required for all machine operators and set-up technicians. Therefore, they have broad applicability to the workforce. The traditional training for these skills is either performed on the job, usually inadequately, or at a training centre such as the CPTC, where the costs are prohibitive for an individual who may be paid less than $10 per hour for these skills.

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE TO MEET THIS NEED

The purpose of the project was to test the effectiveness of CD-ROM simulation to train production workers on two modules of a CPTC injection-moulding certification program. The learnware was tested with employees from participating companies, and the results were compared to a control group trained using traditional CPTC methods.

The 28 employees from ten companies who comprised the beta group received training through the interactive CD learnware. They did not receive any practical training on the operation of the injection moulding machines other than a three-hour equipment orientation. The control group attended the traditional four-day CPTC training program on

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machine operations. This includes one-half day of classroom instruction and two-and-one-half days of hands-on instruction. The control group consisted of eight employees from injection moulding companies and 50 students from CPTC.

The study demonstrated that people trained using interactive learnware could learn the skills needed to operate injection moulding machinery. However, only 35.7 percent of the test group passed the practical hands-on test. The control group, trained using traditional hands-on methodology, had a 98 percent success rate when tested.

D. DESCRIPTION OF MARKET

The plastics industry in Canada employs over 110,000 people, with the average plastics processing company employing fewer than 45 people. In general, the industry is not as knowledge-intense as the manufacturing sector. A range of training solutions is needed to meet the industry's needs: interactive learning is one solution that could have broad applicability. Injection moulding was chosen for the learnware pilot project because it represents 65 percent of the jobs in the plastics processing industry. One of the reasons for focusing the CD-ROM project on the topics of machine start up and shut down is because they are fundamental skills required for all machine operators and set-up technicians, and therefore have broad applicability to the workforce.

E. RESPONSIBILITIES AND FUNDING

CPTC is a technical training institution set up to serve the learning needs of the plastics industry in Canada. CPTC is a result of a collaborative partnership between Humber College, the Canadian Plastics Industry Association (which represents the plastics processing employers in Canada), and the Ontario Federation of Labour (which represents employees who work in unionized plants in the plastics industry). CPTC provided the pedagogical and content expertise to develop the learnware.

Atlantis Aerospace is a Canadian-owned company that develops and manufactures advanced aircraft flight simulators for the civilian and military aircraft industry. Atlantis developed and programmed the learnware.

Husky Injection Moulding Systems is a Canadian company that designs and manufactures advanced injection moulding technology. Husky supplied the control screen data for the project and subject matter expertise to support the development of the program.

The project received the financial support of Human Resources Development Canada through the Office of Learning Technologies which invested $159,000. The other partners invested in excess of $165,000.

F. LINKS TO ACCREDITATION

The CD-ROM program covers two modules of a training course that are part of a CPTC certification program on injection moulding.

G. ON-GOING COSTS/FUNDING

The product is owned equally by the CPTC and Atlantis Aerospace. The CPTC will market and distribute the product, with revenues being split

50/50 after the original investment by the CPTC and Atlantis is repaid. The CPTC will test and certify those people who purchase the product.

H. LONG-TERM PLANS

The product will require further refinement to have market applicability. The CPTC and Atlantis are still determining the next step. The original intent was to develop further modules and offer them as part of a larger certification program. However, the product development costs were high, and the partners are evaluating the feasibility of further development. This decision will determine how far they go to upgrade the existing product. They expect to make these decisions by October 1999.

I. ASSESSMENT OF PROJECT

CPTC concluded that it is possible to teach skills using this type of technology as 35 percent of the participants tested competent in machine operations after receiving no hands-on training. However, CPTC concluded that its objective of eliminating more than 80 percent of practical training was too ambitious if it hopes to maintain a success rate over 90 percent.

In general, participants provided positive feedback about the learnware, and all participating companies said that they would use this type of training in the future, if it were available.

Additional observations from the participant interviews showed that all company coordinators complained about the difficulty of scheduling the participant time for logging onto the training program, and all companies had difficulty finding a quiet, clean space to install the computer workstation.

The following conclusions were drawn from the results.

1. Interactive learnware can be effective in teaching practical injection moulding machine operation skills. However, it is not as effective as extensive hands-on training for the development of these skills.

2. More hands-on instruction prior to testing is necessary. The CPTC provided three hours of machine controls orientation prior to testing the beta group. Speculation by the CPTC staff during the post-training evaluation indicated that the results would be significantly improved if the participants received six hours of orientation and training prior to their test.

3. Learnware is expensive to develop. The CPTC and Atlantis partnership dedicated significantly more time and resources to the project than originally budgeted.

Case Study 4:

CANADIAN PROFESSIONAL LOGISTICS INSTITUTE

### A. DESCRIPTION OF THE LEARNING PRODUCT/SERVICES

The Canadian Professional Logistics Institute was founded in 1990 with the goal of establishing a logistics profession. The Institute's mandate is to sustain logistics human resource development, define logistics career opportunities, and develop comprehensive training. The Institute has developed a certification process for the Professional Logistician (P.Log) designation. The current P.Log Certification Program consists of four modules delivered through interactive, professional development sessions and self-study components.

In April 1998, the Logistics Institute launched a three-year Millennium Project called "The Distance Learning Project." The project includes repositioning the Professional Certification Program onto a career path model and expanding the curriculum. Under the new program, to earn the P.Log designation, candidates will be required to complete as many as ten modules as well as a qualifying module. The new modules put additional focus on customer-value creation, leadership, business management and professional ethics.

One of the key components of the project is the development of distance learning tools and technology-based training opportunities. The Institute's objective is to use distance learning technology to deliver the program, train trainers and create a virtual professional community. This virtual Professional Logistics Network is envisaged as a virtual professional community facilitated by interactive communications technology, and interlinked with resources, activities, other networks and additional components needed for professionals and practitioners to continuously develop their business, career and personal competence. The Logistics Learning Network will be at the heart of the Professional Logistics Network. The focus of the Learning Network is specifically on the development and delivery of interactive training and professional development mediated in various ways by technology.

B. IDENTIFICATION OF LEARNING NEED

The Logistics Labour Market Information study (1997) identified changes in the industry, such as younger people entering logistics as a career rather than just a job, and requirements for higher levels of education and a greater knowledge of technology. The Institute is responding by reorganizing the content of its core modules and introducing new
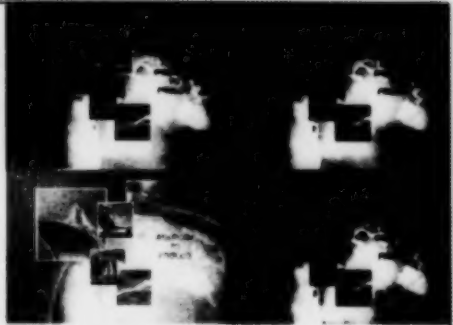
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technology to increase market penetration, meet market demand, and optimize facilitator expertise. The Institute sees technology as key to reinventing its operational design, organizational structure and market development.

Technology will be used to:

◆ create a "virtual professional community" (Professional Logistics Network);

◆ develop products and services for domestic and export markets (Virtual Resources Centre);

◆ deliver professional development and training programs (Virtual Learning Centre);

◆ support its networks (with suppliers, partners and markets); and

◆ organize its operations (e-commerce, databases and board governance).

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE TO MEET THIS NEED

From the beginning, "interactivity" has been the key characteristic of the Institute's professional development program. The Institute feels that "interactivity" differentiates this program from traditional training and education programs, and is core to its professional development identity.

In 1996, the Institute developed a prototype CD-ROM, designed as a logistics system simulation meant to develop logistical skills. At the time, CD-ROM was considered to be an ideal medium for the Institute's training because of its interactivity and features for skills development. The intention was to use the CD-ROM in the Institute's certification process to replace and supplement some of the simulation training done through group-based or board-based games. The product was also intended for broader markets, including high schools.

After piloting the prototype, the Institute found the gap between the development and roll-out costs and the potential return on investment to be too wide. As a result, the project was dropped.

With the proposed online learning format, the Institute is aware of the need to design the medium to maximize interactive impact and achieve learning outcomes. The Institute intends to combine both synchronous technologies (i.e., interactive discussions through the use of chat sessions and net meetings) and asynchronous technologies (i.e., e-mail, threaded discussions, newsgroups, mailing lists and knowledge bases). Module content and learning objectives will determine the appropriate mix, within standard template formats.

The Institute is using Asymetrix Toolbook II Instructor/Librarian. Asymetrix Toolbook Instructor is an authoring tool designed for the creation of on-line learning applications. The facilitator utilizes a "book and page" metaphor for building on-line sessions. After the application is created and tested, the files are transferred into the directory on a server accessible to Librarian. Participants log onto the server via the Internet, and access the course through Librarian. The two tools (Instructor and Librarian) work together and provide a variety of instructional models.

Each of the Institute's online modules will be self-contained learning environments seeded with content. The goal is to put tools into the hands of facilitators to allow them to select and customize module content in line with a generic module template.

Participant learning will combine:

◆ self-paced instructional methods within a specified time frame using asynchronous technologies (participants will register; modules will be scheduled; facilitators will be deployed; and pre-study material will be distributed electronically); and

◆ interactive instructional methods allowing directed collaboration among participants, using synchronous and asynchronous technologies.

The system will provide for a variety of instructional methods, including presentation, reading with written exercises and feedback loops, collaborative work groups and teams, guided discussion, case studies and simulations.

D. DESCRIPTION OF MARKET

Developing distance learning tools and technology-based training will provide the Institute with opportunities to expand its market and position itself for export market development.

The Institute sees the following markets for its learnware:

1. The Institute: for use in its own certification process.

2. High schools: the Institute is linked with high schools in Alberta and Manitoba offering logistics courses and internships, and interest is expanding across the country.

3. Canadian Logistics Industry: the Institute has 10,000 names in its database. Some estimates place the number of people across Canada who deal with logistics as high as 500,000.

4. International Logistics Industry: the Institute is currently developing ties with a number of international organizations. The Council of Logistics Management in the US has an annual conference of 5,000 to 8,000 people. The Institute's President is a member of the Argentine Program Team for the "Programa de Consejos de Formacion Profesional," Direccion de Asistencia Technica Para El Empleo Y La Capacitacion Laboral, Ministerio de Trabajo y Seguridad Social, Republica Argentina. Establishing this working relationship with the Logistics Institute is a first step to building closer links between Canada and Argentina.

E. RESPONSIBILITIES AND FUNDING

The Institute is pursuing a partnership model in the development and delivery of its online learning modules. The goal is to create a virtual development space that puts technological tools into the hands of facilitators and allows them to develop modules for collaborative delivery. To support this approach, the Institute is creating a facilitation program to recruit, select, train and deploy skilled trainers to develop or deliver the program.

The "Dynamics of Teams and Communication" module is an example of the collaborative development process. The module is being developed by the Acadia Centre for Virtual Learning Environment at Acadia University, and includes team members from Trent University and industry.

In addition, the Institute is developing a series of Web sites intended to expand its network capabilities. In addition to its Virtual Learning Network (intended specifically to support the development and delivery of certification modules), the Institute is building three online networks:

1. a Career Network, which includes the following centres:

   ◆ Entrepreneur Centre: providing guides and chat capabilities for entrepreneur training and new business developers. (The Entrepreneur Centre will be connected to other entrepreneur Web sites, such as the You Corp site currently being developed by the Institute and Warrillow & Co., which is intended to get students to think about starting their own business.)

   ◆ Career Internship Centre: providing best practices derived from the award-winning Career Internship Program (CIP) at River East Collegiate in Winnipeg, which the Institute helped establish. This centre will link young people to HRDC and other sources of career information. It also will provide guides to program directors exploring possibilities of creating their own CIP. This development will pave the way for an online certification module in Logistics and Entrepreneurship.

   The Logistics and Entrepreneurship module is being developed by the team associated with the Career Internship Program at River East Collegiate. In addition, students are designing a Web site for their CIP Centre that will be housed by the Institute. The aim of the site is for students who have completed the Logistics Program at River East to look at the Institute as a way of entering into logistics as a career path/profession.

2. a Logistics Community Network, which formalizes in Web-based format the online communications capabilities of logistics professionals, alluded to above. Among the centres included in this Network are:

   ◆ the Professional Community Network, which will form a base for professional networking, as well as providing the opportunity for on-going labour market studies of the logistics community;

   ◆ Pro.Log.Connect, an online career portfolio management system with built-in job search functionality aimed at companies and individuals;

   ◆ a Resource Centre providing an online "retail operation" to access and purchase logistics instructional and information resources. This is open to the public.

3. an R&D Network aimed at fostering an online research community and centres of excellence with universities in Canada and throughout the world.

F. LINKS TO ACCREDITATION

All the online modules are qualifying components for P.Log designation.

The qualifying module is intended to provide the final "testing ground" for professional candidates. After completing a number of required certification modules, all candidates must complete the "Q Module." It is being developed to facilitate a technology-supported collaborative approach. Participants are randomly assigned to teams and work on cases designed to try leadership, ethical and professional competence in a supply chain context. Assessment is based on both individual and team performance.

To strengthen its responsibility to certify individuals, the Institute will establish a professional review board to validate candidate credentials and formally admit them into the profession as Certified P.Logs. The review board will have members drawn from the professional community, thus placing responsibility to accredit professionals directly into the hands of certified professionals.

G. ON-GOING COSTS/FUNDING

The Millennium Project is funded equally by the federal government (Human Resources Development Canada) and industry, with the industry portion including in-kind and revenue contributions. The final pricing for the online courses has yet to be established, but the Institute's goal is to be self-financing based on course revenues.

H. LONG-TERM PLANS

Between April 1, 1998 and March 31, 2001, the Institute aims to design, develop and pilot test 14 of the 20 online components that will constitute its new curriculum.

I. ASSESSMENT OF PROJECT

The Institute has identified a number of challenges in their proposed use of online development and delivery. Given that the key characteristic of the P.Log. program is interactivity, the greatest challenge is to capture the values of group-based, interactive learning when using technology for distance delivery. The challenge for facilitators will be to learn how to use the virtual learning space infrastructure to motivate and energize students and effectively deliver on-line instruction. To ensure awareness of these challenges, the Institute has established the following guidelines.

◆ Give participants a chance to learn actively.

◆ Avoid lecturing.

◆ Develop and foster group involvement.

◆ Build in time for networking and exchange of ideas.

◆ Give everyone the chance to ask questions.

◆ Have fun.

Victor Deyglio, president, explains, "We have moved into a 'virtual environment' in order to develop and deliver training, as well as to organize and structure ourselves and our work processes. The 'logistics of information' (sourcing, processing and distribution) has become our core

business; training content and process are beneficiaries of this commitment to virtual technology."

"Ancilliary to this primary focus, but equally important, is the development of networks (as described above) around the technological capabilities to develop and deliver training. The key to our successful use of virtual technology will be inter-organizational network'

Case Study 5:

EATON SCHOOL OF RETAILING AND RYERSON POLYTECHNIC UNIVERSITY

A. DESCRIPTION OF THE LEARNING PRODUCT/SERVICES

In 1994, the T. Eaton Company Ltd. recognized that there was no school in North America that delivered a university-level degree in retailing. In response, it created the Eaton School of Retailing (ESR). In May 1994, ESR formed an alliance with Ryerson Polytechnic University to develop and deliver university-level certificate and degree programs for retail managers. Since then, the Canadian Retail Institute/Retail Council of Canada and individual retailers and suppliers have joined in to help create programming and build delivery systems.

The program resulting from this alliance is the Retail Management Program, a Canadian university program for retail professionals. To date, the program includes a Bachelor of Commerce (Retail Management) degree and a Certificate in Retail and Services Management I and II.

ESR and Ryerson were committed from the beginning to making the program available through distance education to enhance access. Their goal was to establish an electronic distance education system to support staff training, recruitment, and retention in the retail sector. Their joint vision was to offer world-class retail education on a global scale, using a distance education network accessible by anyone, anywhere, anytime. After experimenting with a variety of formats, including audio and videoconferencing coupled with CD-ROM support, they transferred all courses to an Internet-based distance format beginning in September 1998.

The program includes courses on information system applications, retail management communication, service and professionalism, organizational behaviour, retail and services management, retail marketing, human resources management, and issues and innovation in retailing. What is unique about the content is that 20 of the 40 courses are retail specific.

Online students can move through lectures, conference addresses and other didactic material supported by PowerPoint graphics or other visuals. Presenters can be brought into live question and answer forums by phone and broadcast using RealAudio. Students participate in these sessions using Internet Relay Chat (IRC). Students also have access to Ryerson's electronic library.

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B. IDENTIFICATION OF LEARNING NEEDS

Beginning in December 1993, T. Eaton Company Ltd surveyed over 300 people as part of a needs analysis process for the retail program. Working teams were created in each functional area, and people conducted research with their peers to define their learning needs. Core competencies were developed for each position. Now within the company, each employee builds a personal development plan with the manager selects courses from the education program.

In 1996, the retail sector as a whole began to participate in the development and delivery of the program through the sectoral steering committee and five sub-committees established under the Initiative in Retail Management Education (National Sector Adjustment Service, Human Resources Development Canada).

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE TO MEET THIS NEED

Currently all courses in Certificate I are delivered over the Internet, and are supported by a range of electronic communications tools, including e-mail, bulletin boards and IRC. Additional supportive learning methods include videotapes, audiotapes and audio-conferencing. The computer lab at Ryerson can be used by students to access the course.

From the start, the Eaton School of Retailing and Ryerson were committed to making the program available through distance education. In April 1996, an eight module CD-ROM on "Retail Merchandising and Finance" was released. In May 1997, Ryerson began delivering Retail and Services Management I by distance education, one day a week for six weeks, to five locations in Ontario and Winnipeg. This was the first course in the Retail Program to use CD-ROM and distance education. In September 1997, the first Internet-based course leading to a Retail and Services Management Certificate I was introduced. In September 1998, the Bachelor of Commerce (Retail Management) degree was introduced, and all program courses were transferred to Internet-based delivery.

D. DESCRIPTION OF MARKET

The target audience is retail professionals. Approximately 4,000 students have taken the course to date, including employees from companies such as The Bay, Sears, Toys R Us, Eaton's, Canada Post Corporation, Bell Canada and Levi-Strauss of Canada. The courses are available world wide to anyone with Web access. In addition to Canada, current registrants are located in the United States and Brazil.

As an example of costs to learners, the registration cost for Introduction to Retail Management Communication -- one of the eight courses making up the Certificate in Retail and Services Management I — is $540, including materials. However, many companies have tuition reimbursement policies.

Original plans called for the CD-ROM to be used as a source of ongoing revenue by selling it as a textbook for university and high school curricula, and as a stand-alone learning tool for North American retailers. This approach proved unfeasible because the infrastructure (CD-ROM players)

was not in place in the market. Instead of pursuing the CD-ROM platform, the switch was made to design all future multimedia for online delivery.

E. RESPONSIBILITIES AND FUNDING

The driving forces behind the program's development were the T. Eaton Company Ltd., through ESR, and Ryerson Polytechnic University. The Canadian Retail Institute/Retail Council of Canada and individual retailers and suppliers have joined in to help create programming and build delivery systems.

Eaton's has been the major underwriter of the program to date, supplemented by federal (HRDC) and provincial funding. Eaton's estimates it will have contributed about $3 million to developing the course content for the four-year Bachelor of Retail Management program. (Eaton's financial contribution includes $150,000 provided to Ryerson to develop the eight module CD-ROM.) The Ministry of Education and Training (Ontario) contributed $250,000 to move the program to Internet-based delivery.

Additional contributors include Bell Canada, a strategic partner in the piloting of audio and videoconferencing delivery; and Management Horizons, a division of PricewaterhouseCoopers, which donated access to its retail resources for research.

Administrative responsibility

Currently, an internal Program Advisory Committee at Ryerson, with both industry and Ryerson representation, guides the program. In addition, there is a sectoral steering committee and five sub-committees under the IAS Initiative in Retail Management Education.

For the duration of the ESR/Ryerson alliance, there is only one legal written agreement: the 1994 agreement to develop and deliver university-level certificate and degree programs for retail managers. However, for each new stage, a detailed business plan was prepared jointly by ESR and Ryerson through a four-person ESR/Ryerson Management Committee. The committee met regularly, with each party taking responsibility for managing their own internal processes to expedite the process.

Production of the learnware

Ryerson produces the multimedia and Internet-based course material at the Rogers Communication Centre and provides the instructional design and content for the learnware. ESR and the other retail sector representatives assess the content throughout the production process to make sure it reflects the reality of the sector.

Evaluation of the learnware

The Centre for Research on Lifelong Learning carried out a research study called "Getting the Most Out of Learning" to examine the transfer of knowledge from the ESR learning experience to the workplace. The goal was to help participating companies measure their return on investment and make better use of what their employees learned. A cross-section of past participants from Eaton's and Canada Post were interviewed. Participants identified numerous supportive strategies for increasing the

impact of the ESR experience. The centre used the study data to develop "ESR: The Next Steps," a project to create appropriate support for the ESR learning. (Available at www.canadianretail.org.)

Research and development component

In 1998, the program received a $125,000 grant from the Office of Learning Technologies to develop a tool kit to help education and training organizations identify techniques for testing and evaluating distance education courses. (Available at www.canadianretail.org.)

Learner support services

Make the Most of It! a resource guide, is available on the Web site. Part 1 is "Tips for Students," Part 2 is "Tips for Managers."

F. LINKS TO ACCREDITATION

To date, the Retail Management Program includes a Bachelor of Commerce (Retail Management) degree and a Certificate in Retail and Services Management I and II. The certificate program serves as a building block for the BCom.

G. ON-GOING COSTS/FUNDING

The Canadian Retail Institute is launching an industry-wide initiative to develop a Curriculum Development Trust to fund further development of the program. This will be supplemented by research and development grants.

From the learner's perspective, Eaton's employees, with their managers' approval, are eligible for financial reimbursement of up to 90 percent of the cost of tuition, and up to $50 for course materials, upon successful completion of a course.

H. LONG-TERM PLANS

A partnership has been established with a retail council in Belo Horizonte, Brazil. In exchange for access to the eight-module "Retail Merchandising and Finance" multimedia program, the Brazilian organization will finance the development of five additional modules, as well as the translation of all 13 modules into Spanish and Portuguese.

I. ASSESSMENT OF PROJECT

Both the Canadian Retail Institute/Retail Council of Canada and the US-based National Retail Federation have honoured the Retail Management program with a Special Recognition Award. When these awards were presented, mention was made of:

- the importance of the university-industry partnership that has been created;
- the quality and relevance of the program, and its value to the retail community; and
- the innovative uses of technology in program delivery.

In addition, the Conference Board of Canada selected the program for its University-Business Partnerships Award in 1996, in recognition of the close and mutually respectful working relationship that Ryerson Polytechnic

University, the Eaton School of Retailing, and the Canadian retail sector, as a whole, created to develop and support the Retail Management Program.

Strengths of the design and implementation

The strength of the design and implementation are the combination of university and corporate partners designing the program from the ground up. The participation of Ryerson gave the project credibility in terms of developing a well-designed, accredited learning program. The steering structures, with their high level of consultation with the retail sector in areas such as curriculum development, have given the program credibility with the end user looking for applied learning. Access to Ryerson's Prior Learning Assessment Process has benefits for employees with work experience but no equivalent degrees.

Challenges/roadblocks

Merging corporate and academic cultures in this program also provided the major challenges/roadblocks. The partners spent a lot of time educating each other about their respective cultures. They needed to open their internal processes to each other to help in understanding their operating environments. For example, ESR representatives sat in on Ryerson's curriculum committee. As a result, they developed more realistic expectations. ESR realized it couldn't be too rigid about Ryerson meeting timelines. On the other hand, Ryerson had to meet ESR's needs for tangible deliverables. For example, it was important to ESR to establish Prior Learning Assessment for the program, but it accepted Ryerson's requirement to first produce the curriculum.

Things to do differently?

The partners say they wouldn't have done anything differently. One of the reasons for this outcome is the flexibility of their planning approach. With a long-term relationship, the partners couldn't have detailed all the elements of this partnership at the beginning because it evolved almost weekly. This openness allowed them to change directions as needed.

Lessons learned

1. A high level of trust is required between partners. ESR and Ryerson did not rely on written contracts, aside from the general agreement signed March 1994.

2. Flexibility is required in the approach to technology. A flexible approach allowed the partners to change delivery formats as the technology advanced over the four years of the project.

3. There is a need for involvement and support at the highest level. For both partners, the CEOs were personally involved and committed to the product and the goal.

4. There is a need for widespread sector buy-in. The program has incorporated a high level of consultation with the retail sector through a variety of steering structures. This sector-wide involvement will be critical for the fund-raising drive for the Curriculum Development Trust.

5. It was important to house the program in an educational institution. This approach ensures the program's continuation regardless of the changing interests of individual corporate players. ESR has now been absorbed into Eaton's Human Resources Department and has changed its focus from external to internal activities.

6. From Ryerson's perspective, one of the key strengths has been not requiring funding from the university. Part of the strategy was to ensure, as the program moved along, that it did not cost either organization any exceptional new amounts of money.

7. "Partnerships only work if all parties get something out of it. Legal contracts only tell you what will happen when things dissolve. They don't tell you how to make it work. Our effort has gone into finding the basis for success," says Jim Chestnutt.

Distributed Systems - Course Map
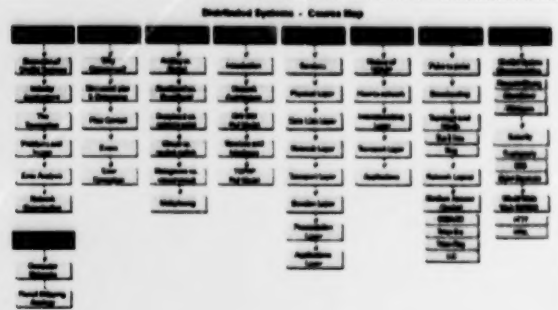
Case Study 6:

EDUCATIONAL PROGRAM
FOR SOFTWARE PROFESSIONALS

A. DESCRIPTION OF LEARNING PRODUCT/SERVICES

The Education Program for Software Professionals (EPSP) offered by the University of Waterloo was launched in September 1994. The first classes started in May 1996. The objective of the program is to develop highly trained software professionals capable of developing and maintaining computer-based applications and supporting new strategic products and services. The six-course program in Software Technology can be completed over a period of six to 18 months, depending on whether the student is studying full- or part-time. After passing each course, students receive a certificate. Students who successfully complete all six courses receive a diploma from the University of Waterloo. Each graduate of EPSP becomes an alumnus of the university.

EPSP can be taken in the following ways:

1. in a classroom format delivered by University of Waterloo instructors at an employer location or on the university's campus;

2. in a classroom format delivered by instructors from the alliance partner at one of the partner locations; or

3. by distance learning using CD-ROMs and the Internet.

For distance learning, each course is provided on a CD-ROM as a stand-alone learning resource or part of the complete certification package. Some of the courses are complete, while others exist in prototype form. The certification package includes the CD-ROM, textbooks, assignments, tutor support by e-mail and a proctored examination. Each CD-ROM contains a set of course concepts designed to promote the student learning through interaction, illustrated text, animation, audio, related reference material and access to tutor assistance.

B. IDENTIFICATION OF THE LEARNING NEED

Information technology (IT) is changing so rapidly that it is difficult for software professionals, many of whom learned on the job, to retain leading-edge competency while maintaining and developing computer-based applications. EPSP provides the necessary foundation of computer science knowledge without a constant need to take training courses for the purpose of upgrading computer-based skills.

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Prior to the introduction of EPSP, this type of education was only available through full-time computer science degree programs offered at universities. Only a few universities even offer part-time computer science courses. The University of Waterloo recognized that most working software professionals could not access computer science programs at universities because of location or economic and scheduling constraints. Because of this, EPSP developed part-time, in-class courses first, and is now converting them to distance education versions available on CD-ROM.

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE TO MEET THIS NEED

Suitability of content

EPSP provides the education fundamentals with which to develop software application skills, and as such, builds the foundation that all software professionals need. The content is based on selected topics from the undergraduate computer science curriculum of the University of Waterloo.

Ability to reach target market

The program can be taken anywhere with access to a suitable computer. Access to the Internet and the World Wide Web is desirable.

Suitability of delivery platform

The CD-ROM was chosen as the delivery platform because it allows students to work at local desktop computer speeds without the need to be constantly on-line with a service provider. However, the content of the CD-ROM has been constructed so that it can be transferred directly to the World Wide Web.

D. DESCRIPTION OF MARKET

The target population is IT software professionals who developed their skills on the job or whose formal IT education was more than ten years ago. Software Human Resource Council (SHRC) surveys estimate that there are more than 150,000 individuals in Canada fitting this description. The need for this type of program is mirrored throughout the world. The goal of EPSP is Canada- and world-wide coverage through alliances and distance learning delivery.

To date, five graduating classes have produced over 100 graduates with diplomas. An additional 192 students are currently registered in EPSP.

EPSP is currently focusing its marketing efforts on the financial sector. Companies offering program delivery at their locations are: Liberty Health, Bank of Montreal and Canada Life. The federal government also uses on-site program delivery. Other companies from other economic sectors are represented at classes held at the University of Waterloo campus, through the EPSP alliances and via distance delivery.

E. RESPONSIBILITIES AND FUNDING

Initial costs/funding

The SHRC is a not-for-profit organization formed in 1992 to act as a national catalyst in addressing the software human resources issue. It provided EPSP with a start-up loan of $660,000. This loan is being repaid based on the number of student education days completed in the program each month. EPSP provides a monthly report to SHRC on student in-take, completion and forecast.

In addition, the Bank of Montreal provided a $700,000 donation to the University of Waterloo. Access to these funds was made available to EPSP, however, this option was never exercised as incoming revenues were sufficient to maintain solvency.

Analysis of learner profile and needs

Beginning in 1995, the University of Waterloo was provided with information from an in-depth survey for a major Canadian corporation in the financial sector. The survey showed that many software professionals had little or no formal IT education. In order to upgrade their IT skills, they would require continuous access to product training courses. Additional research determined that a focused, university-level set of computer science courses would provide these individuals with a foundation on which to build their professional IT development, and significantly reduce their need to participate in technology-specific training.

Instructional design of learnware and provision of content for the learnware

A team from the Computer Science Department at the University of Waterloo developed EPSP. The curriculum was taken from the undergraduate computer science degree program. The course designers hold appointments at the University of Waterloo and are employed part-time by EPSP as instructors.

Production of learnware

The learnware course content is derived directly from its finely tuned lecture series counterpart. The CD-ROM development, based on the LivePage software from LivePage Corporation, takes advantage of leading-edge tools to develop and produce the course content. In response to client feedback to the first prototype CD-ROM, two new innovative software products were developed: Study Mate, which incorporates self-testing procedures and records progress; and Communications Cop, which manages communications between the students and the tutors.

Provision of the content for the learner support materials/system

Each CD-ROM, through its presentation, structure and format, is designed to provide a comprehensive, self-study system. For example, students can navigate their way through the first course, Modern Programming Methods (MPM), which contains more than 150 distinct concepts, using features such as a course road map, self-assessment quizzes, animated graphics and a course comprehension grid. In addition, the student has access to a tutor via e-mail who will answer course-related questions, and provide additional assignments in preparation for the final exam.

Delivery of the learner support materials/system

The CD-ROM is currently delivered through the postal service. All student support is delivered by e-mail or the World Wide Web.

Administration of the learner sign-up

Students can register by mail, telephone, fax, e-mail or by the World Wide Web.

Administration of the learner testing

The University of Waterloo prepares the final examination. Learner testing is through proctored examinations, which are prepared and marked by the University of Waterloo. Students write the examination at established University of Waterloo examination sites located near their homes. These sites have been established in Canada and abroad.

Evaluation of the learnware in development

To ensure product quality, each CD-ROM version is beta tested with a group of students. The feedback obtained from this test group is incorporated into the final version. The Modern Programming Methods course completed this process and was released to the market in January 1999. Each of the remaining five courses will be contained on individual CD-ROMs, with the final course having a planned release date of January 2000.

Evaluation of the learnware in post-development

Students provide evaluation of the learnware during and at the completion of the course. This information will be used to update future versions.

Marketing the learnware

Overall marketing of the EPSP program is carried out by EPSP. Marketing consists of advertising, direct calls to senior company management and presentations at appropriate conferences. Professional organizations, such as Computer Information Processing Society and Institute for Technology and Computing are also involved in marketing the program. SHRC also promotes EPSP at many events.

Distributing the learnware

EPSP developed, and is continuing to develop, relationships with colleges, universities and private training organizations in Canada and abroad with the intention that they should deliver the program. These organizations are called alliance partners. The Canadian alliance partners instrumental in helping the University of Waterloo deliver EPSP include: Technical University of British Columbia, University of Regina, Conestoga College, Humber College, CDI Corporate Education and Keltic Learning Centers.

The alliance partners are responsible for recommending suitable instructors for certification, providing classroom facilities, advertising for students and collecting student fees. They are also responsible for all local administration.

In the start-up phase, EPSP provides partners with a complete EPSP package including curriculum, instructor material, student notes, instructor certification, textbooks, software, assignments and examinations. The partners may subsequently assume control of many of these services

themselves. However, control of the course curriculum is retained by EPSP, along with the setting and marking of examinations, issuing the certificate/diploma and certifying the instructors.

Learner involvement in design/implementation/governance

Students provide input to the course design, improve implementation methods, and help formulate policy and procedures that govern the EPSP operation through questionnaires and through the questions they ask during the course.

F. LINKS TO ACCREDITATION

Course accreditation is an important aspect of the EPSP program. It verifies that students have successfully completed a course of study, and have demonstrated their understanding of the course material by passing an examination. The University of Waterloo awards a certificate for passing each course examination. A diploma is awarded when all six courses have been successfully completed. Upon obtaining the EPSP diploma, credits can be applied towards a University of Waterloo Computer Science degree, should a student wish to continue. The Canadian Information Processing Society has recently recognized EPSP as providing enough education credits for their members to recertify their ISP status.

G. ON-GOING COSTS/FUNDING

Revenue comes from three sources. Fees from:

1. alliance partners delivering EPSP;
2. individual students and business clients; and
3. distance CD-ROM sales and support.

Fees from alliance partners

Alliance partners pay 13 percent of student revenues to EPSP. In addition, EPSP invoices alliance partners for the real cost of any service they require. Mandatory services include course examination generation, examination marking and instructor certification.

Student fees

The total fee for all six courses is $8,395 if taken on campus at the University of Waterloo or at one of the alliance partners. The fee includes all student materials (textbooks, software and student notes) and access to a laboratory containing desktop computers. The six courses contain a total of 23 six-hour days of instruction, at a cost to the student of $365 per day.

If delivery is at an employer's on-site location, the cost is reduced to $300 per day for a total of $6,900, since the on-site client provides classroom facilities and access to computers.

The distance delivery fee is $1,150 per course for a total cost of $6,900. This fee includes the instructional CD-ROM, a set of standard student materials, assignments, access to an EPSP tutor via e-mail, and a proctored examination.

H. LONG-TERM PLANS

Provide on-line delivery of all courses

The long-range plan is to move to on-line delivery of all courses. The distance delivery version is being created in HTML to facilitate easy transfer to the on-line mode. In the short term, when changes warrant, updated versions of the CD-ROM will be released.

Development of pre-EPSP program

As a result of market feedback, it was determined that a pre-EPSP course was required to address the need of learners that would like to enroll in the EPSP program but did not have the required programming skills. This pre-EPSP course is developed, and will be available for its initial in-class offering in September 1999, with subsequent availability on CD-ROM by February 2000.

Development of graduate EPSP program

Graduate EPSP courses covering Data Mining and Java have been developed. Java has already been delivered in-class. The Data Mining course will be available for in-class delivery in September 1999. Both courses should be available on CD-ROM in the fourth quarter of 2000.

Development of EPNP

The group operating EPSP is planning to expand its program to include a five-course sequence related to networks called the Education Program for Network Professionals (EPNP). This area of communications has many of the same characteristics as the software field. Most professionals learned on the job and did not establish a solid educational foundation on which to build their knowledge.

In general, EPSP would like to expand course offerings by seeking support in the form of grants. Because EPSP operates within the university, funding sources are limited, and traditional sources, such as venture capital, are not accessible. EPSP is actively exploring options for alliance partners in other countries. Denmark has requested status as an alliance partner. Inquiries have also been received from Japan, the UK, India and Singapore.

I. ASSESSMENT OF PROJECT

EPSP has developed a program that is successfully meeting a need, judging by the growing number of alliance partners and industry employers seeking access to the program. One indication of program satisfaction is that the Bank of Montreal has had two groups of students graduate from the program and is actively assembling a third. EPSP expects to offer its in-class delivery of courses in seven Canadian provinces and in Denmark by October 1999.

Student and instructor feedback over the past three years has enabled the development team to fine tune the in-class lecture materials. It has also provided valuable input for the design and creation of the CD-ROM distance version. In the latter case, replacing the instructor with a stimulating, interactive electronic delivery system took longer than was originally planned. However, feedback from courses currently available indicate that the additional design features were worth the delay. Even

with the increased development cost, the return on investment for the distance product should prove to be better than the other methods of delivery.

Success of the EPSP project is due mainly to the applicability of the curriculum to the target audience, to its delivery methods and to the University of Waterloo, which has an excellent reputation for IT education. In addition, it is believed that the price point of the product is well positioned with respect to other commercial IT course offerings.

For example, according to the *Hitech Career Journal*, the student fees of $365 per day are less than the cost of most technology courses in the marketplace.

One of the strengths of the program is the way it was developed, with time and care taken for design and implementation. The program started small, was based on first-hand experience and had revisions made based on student and client feedback.

Another strength of the program is the control retained by the University of Waterloo in course content and testing. This means that the student is assured that all methods of taking the course have the same value and result in the same diploma. This control is achieved by having all students take the same proctored examinations. By controlling the setting for and marking of the examinations, EPSP is able to maintain the integrity and quality of the program.

The biggest challenge is maintaining quality and integrity, given that there are numerous bodies involved in program delivery. The examination results are an important indicator of the quality of course delivery. Given their importance in this process, the examination contents are strictly confidential and examination papers are only delivered on the day of examination.

Another challenge is maintaining what Program Director John Green refers to as "channel harmony" among the three delivery methods (University of Waterloo, alliance partners, distance education). Channel harmony is maintained by standardizing the course fees and regulating the number of alliance partners in a geographic area. As distance delivery volume increases, alliance partners will be offered tutoring opportunities based on student postal codes.

Some of the lessons learned are:

1. Not to impart too much knowledge too quickly. Student feedback indicated that the program was moving too fast, and should be spread over a longer period of time. Based on this feedback, the program was expanded in length from 21 1/2 days to 23 days.

2. People need the same background knowledge level before starting the EPSP program. The EPSP team recognized the need for a precursor course to bring students to the same level of knowledge. By providing this service, the student start-up differentials of the first course will be reduced, and the intake from the market will be broadened.

3. Both student and employer must be committed to the program. Three hours in the classroom per week translates into about 12 hours of student time outside the classroom for reading and completing

assignments. This can place a heavy demand on the student who has a full-time job. A few students have dropped out because of the combined workload. The pressure is eased if the employers are supportive, such as providing their employees with time off during the workday to attend lectures. This type of support is common among the current clients of EPSP.
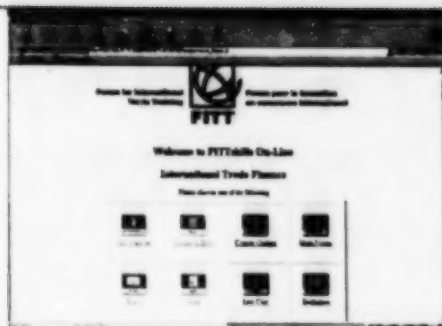
Case Study 7:

FORUM FOR INTERNATIONAL TRADE TRAINING

A. DESCRIPTION OF THE LEARNING PRODUCT/SERVICES

The Forum for International Trade Training (FITT) was launched in 1992 as a private- and public-sector international trade training initiative to foster global expertise among Canadian small- and medium-sized enterprises (SMEs) and establish countrywide standards in the practice of international trade. Founding members include the Alliance of Manufacturers and Exporters Canada, the Canadian Chamber of Commerce, the Canadian Federation of Labour, the Canadian Importers Association Inc., the Canadian Professional Logistics Institute, the Canadian Professional Sales Association and World Trade Centres Canada.

FITT established a professional curriculum for the practice of international trade, the *FITTskills* program, and developed a number of other programs and workshops delivered across Canada. The *FITTskills* program is FITT's core product line. *FITTskills* is an eight-course training package focusing on the practical aspects of international business, including logistics, trade finance, nation-by-nation marketing opportunities, market entry strategies and sound international management techniques. It is a toolkit, based on everyday, real-life examples of what works and what doesn't work in international trade. The eight courses in the program can be taken individually or as a comprehensive program. Each course is followed by a national examination. In addition, individuals can now apply for *FITTskills* credits through Prior Learning Assessment and Recognition (PLAR).

In June 1998, FITT proposed the delivery of *FITTskills* through electronic delivery. This involved converting all eight *FITTskills* modules into Web CT, a structured Web-based, on-line environment combining live, instructor-led training with just-in-time, self-paced learning. In January 1999, the *FITTskills* program made its debut on-line.

B. IDENTIFICATION OF LEARNING NEEDS

The *FITTskills* program arose from an acute need for greater skills development among Canadian SMEs making the transition from the domestic to the global marketplace. Many SMEs have difficulty implementing a global strategy because of an inability to secure financing, insufficient planning, or a lack of overall skills and knowledge among their staff and management core. The eight courses in the *FITTskills* program are compiled, developed and taught by international trade practitioners who are experts in their field.

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The decision to offer an electronic version of the *FITTskills* program was motivated by research findings. In a survey of 500 companies, 73 percent expressed interest in a technology-based distance learning application of the *FITTskills* program, despite having limited knowledge of FITT and its programs. A subsequent, more detailed survey completed by the Halifax Group on behalf of FITT determined that owners and senior managers of medium-sized enterprises do not attend *FITTskills* courses offered in the colleges and universities across Canada. The major reason cited was the time constraints associated with managing a business. The study found that 45 percent of the respondents were interested in a practical, hands-on and how-to approach to learning, which was independent of time or place.

By using electronic delivery, FITT can reach a geographically dispersed audience, accommodate different learning styles, and offer more training to more people on more subjects with higher impact and effectiveness. One of the benefits of FITT's electronic delivery is that individuals not able or willing to enroll with a delivery partner have another choice. For example, a delivery partner may not be able to offer classes due to a minimum class size or availability of space. Also, FITT is able to respond to the needs of major corporations that require delivery with special timing.

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE

The movement towards electronic training delivery reflects the reality of today's educational market, including a need for more flexible and timely delivery of education and training materials. Today's adult learner is faced with considerable demands on his/her time, including increased workloads, requirements for business travel and other challenges associated with life in the 90s.

There are a number of business and educational benefits to electronic learning, including:

◆ reducing travel costs associated with training;

◆ allowing a participant to access a training course regardless of location; and

◆ allowing participants to learn at their own pace and on their own schedule.

Many limitations considered inherent in electronic-based learning systems are being phased out by advancements in technology. Increasingly, Web-based training systems are compatible with a full range of hardware/software, and are available at lower costs. More advanced systems also provide facilitation for a high degree of interaction between participants and instructors. In addition, there is increasing knowledge and acceptance of technology-assisted learning as a viable alternative to traditional classroom-based instruction.

FITT is among the first in the world to offer international trade training on-line. FITT ensures that instructors of the electronic program have participated in an onsite or online train-the-trainer session or received instructor information on how to get the best results using an electronic delivery format.

D. DESCRIPTION OF MARKET

FITT's market is small- and medium-sized enterprises in all sectors, as well as trade active companies that require in-house and on-going international training to meet the challenge of "going global." FITT has over 10,000 registrants across Canada and estimates their potential market to be 60,000 to 70,000 Canadian SMEs with exportable products and services.

FITT's research, referred to above, indicated considerable interest in and demand for an alternative method of delivery. FITT estimates a 20 percent increase in *FITTskills* total enrollment as a result of introducing the electronic option and the associated marketing efforts. Potential purchasers are anticipated to be busy professionals with significant burdens on their time, seeking "just-in-time" delivery of materials relevant to their work and industry. Many individuals find the option of being able to complete their course of study while maintaining their business and personal timetables to be attractive. In some cases, individuals have not been able to complete their Certified International Trade Professional (CITP) requirements using traditional delivery.

E. RESPONSIBILITIES AND FUNDING

In 1992, Human Resources Development Canada's Sector Partnership Initiative provided the development funds for FITT for the initial three years, with endorsements from the Department of Foreign Affairs and International Trade and Industry Canada. HRDC provided financial support on a project-specific basis for *FITTskills* On-line.

FITTskills in the classroom is delivered through a network of community colleges, universities and private training institutions across the country. Online participants can enroll directly with FITT and identify a local *FITTskills* delivery partner. Participants receive program information on the *FITTskills* program from FITT or from an education calendar or advertisement used by a delivery partner. Information indicates the two methods of delivery: traditional classes and electronic format. In the event the delivery partners can not get sufficient enrollment to offer a traditional class, participants are offered the electronic format. However, FITT prefers that participants enroll with delivery partners because they are able to add local flavour and provide opportunities for participant get-togethers.

FITT responsibilities:

As owner:

- ◆ arranges to have the electronic course format ready for delivery and makes updates as required;
- ◆ arranges for technical support as required;
- ◆ assigns passwords for FITT and delivery partner participants;
- ◆ markets *FITTskills* electronic format delivery;
- ◆ arranges for train-the-trainer training; and
- ◆ develops curriculum.

As deliverer:

◆ contracts instructors as required;

◆ receives and reviews course and instructor evaluations;

◆ provides material to those enrolled;

◆ provides exams to those eligible;

◆ arranges for marking of exams; and

◆ maintains participant history records.

Participant responsibilities

◆ obtains necessary computer equipment and Internet provider;

◆ pays course and exam fee;

◆ reads the technology instructions;

◆ completes course work;

◆ prepares for and writes the exam; and

◆ completes the course evaluation.

Electronic participants take the paper-based course exam at the site of the delivery partner, where available, or with a local invigilator hired by FITT.

F. LINKS TO ACCREDITATION

In 1997, FITT established the only professional designation in Canada for international trade practitioners, the C.I.T.P. designation. Launch of the designation was preceded by a survey of Canadian companies undertaken by KPMG to gauge industry's approval of the idea. Results indicated not only overwhelming support for the designation, but that all company representatives would give preference to individuals with a C.I.T.P. designation when hiring and promoting.

For individuals with at least three years experience in international trade, the first step to becoming certified is successfully completing the *FITTskills* program. Successful completion of the eight courses leads to a Diploma of International Trade from FITT and satisfies the basic educational requirement for the C.I.T.P. designation.

G. ON-GOING COSTS/FUNDING

Funding sources are derived through the sale of FITT's products and services, and through project-specific funding from HRDC.

On average, the *FITTskills* courses are purchased by participants for approximately $450 each. Fifty-six percent of *FITTskills* participants are supported by employer contributions of time and/or costs. In some cases, participants access funds through HRDC to participate in the program.

H. LONG-TERM PLANS

By the end of 1999, all eight FITT courses will be online in English, and by fall 2000, all FITT courses will be online in French. FITT's long-term goal is to continue to develop and deliver new and innovative products and services, through expanded delivery partnerships.

I. ASSESSMENT OF PROJECT

In 1997, HRDC sponsored an evaluation of FITT by Ekos Research and Associates. All interview respondents agreed strongly that there is a continuing need for FITT and that FITT remains highly relevant to the needs of companies engaged in international trade. The need for international trade training is thought to be greatest among small and medium enterprises, which is FITT's target audience.

All respondents spoke highly of FITT programs, and described the training programs developed as "quality products." Respondents noted that they have heard only positive comments on FITT training. Partners interviewed also reported being satisfied with their partnership with FITT, and satisfied with the results.

With respect to *FITTskills* Online, both participants and instructors fill out evaluation forms. FITT General Manager Caroline Tompkins explains the findings: "The biggest challenge with online courses is encouraging interactivity among the participants, and between participant and instructor. We try to stimulate involvement by basing 15 percent of the student's mark on the instructor assessment mainly gauged by the level of online participation. Also, we try to keep the minimum class size to 15 to ensure there is enough online exchange. We encourage students to meet in face-to-face study groups, if they live or work close to one another. But ultimately this matter is a function of individual student motivation and there is only so much we can do."

"Another issue we face is ensuring that students have adequate computer skills before they take the course so that we don't end up having to provide 'Keyboard 101.' We're trying to deal with this issue by stating our expectations clearly in our communication with the students."

FITT established the following critical success factors for the electronic delivery format of the *FITTskills* program.

1. The system must be user friendly. It should be easy to operate for all participants with basic computer skills.

2. For ease of use, the system should utilize a graphic interface, including drop down menus, etc., currently found on most Windows- or Mac-based applications.

3. The system should support the use of both Windows-and Mac-based systems.

4. The system should be fully functional when operated on a "standard" personal computer configuration. Ideally, a user should be able to effectively use the system with a minimal hardware platform.

5. Access to support, including on-line help and dedicated technical support must be easy and timely. Documentation should be comprehensive and easy to understand.

6. Participants should be able to access the system through their own Internet service provider or a dedicated Internet connection.

7. The system should contain password-based security, both to control access and in the interest of confidentiality of participants' work.

8. The system should support multiple "start dates." This would allow additional classes to be scheduled as numbers warrant.

9. The system must support multiple concurrent classes, scheduled as demand warrants.

10. The system must allow access by multiple instructors, accessing different groups of participants.

11. The modular aspect of the *FITTskills* program must be supported by the system.

12. Due to participants' schedules and concerns such as time zones, the system should support both asynchronous and synchronous use.

13. Participants need the opportunity to work "off line" as needed, and be able to connect to the system for purposes of updating e-mail files and other materials.

14. The learning system should support interaction between participants, either through real time "chat rooms" or through discussion sessions.

15. The learning system should support "self grading" assessment tools including exercises, quizzes and examinations (including multiple choice and short answer).

16. The system needs to operate in French, and potentially in Spanish and other languages.

17. The system must be successfully integrated with existing methods of delivering *FITTskills* training.

18. Software will need to accept necessary modifications on an ongoing basis in order to keep current.

19. Costs associated with the system should reflect FITT's current realities and strategic plan.

Case Study 8:

SMART SERVE ONTARIO

A. DESCRIPTION OF THE LEARNING PRODUCT

SMART SERVE is a responsible beverage service training program for servers of beverage alcohol in Ontario. A training kit costs $129 ($104 for hospitality organizations that are members of Smart Serve Ontario, a division of the Hospitality Industry Training Organization of Ontario). The kit includes the training program on videotape, a facilitator's guide and workbook. Individual certification kits cost $18 ($13 for hospitality organizations that are members of Smart Serve Ontario). This price includes a workbook, a test, test processing, and awarding of certificates and pins to successful participants. One retake test is included if a passing mark of 80 percent is not achieved.

This self-directed, interactive training process involves watching the video and completing the exercises in the workbook. At the end of this, a 25-question multiple choice test is taken.

B. IDENTIFICATION OF LEARNING NEED

From 1989 to April 1995, a beverage server training program was offered by the Addiction Research Foundation. The program was classroom-based and took five and one-half hours to complete. The cost of the program was $30 to $75 per person. Given that the industry has a turnover rate of 30 to 80 percent it was found that:

◆ the program was cost-prohibitive;

◆ the program took too long to deliver; and

◆ the program was not sufficiently accessible. (Instructors taught the course in establishments or set up training sites, but only in more populated areas.)

A rumour that the Ontario government was considering making the training mandatory created a major incentive to re-examine the delivery approach. The industry was stimulated to examine other options that would be less costly, reduce training time and be more accessible.

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE TO MEET THIS NEED

In 1993, DVS Communications was commissioned by the hospitality industry to do a front-end needs analysis. They concluded that the training program should be delivered on video and CD-I.

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Smart Serve offered CD-I players for sale at the same discounted price they receive from Philips ($650 or $850, depending on the model). However, it was found that the vast majority of the purchasers preferred video. Most licensed establishments have VCRs, and do not find sufficient added value to justify purchasing a CD-I player. As a result, the CD-I was dropped from the training package. (However, there is interest in a CD-ROM version.)

The training program is now shorter: the video has a running length of two hours, and the program takes about three and one-half hours to complete. Because the program is self-directed, there is a great deal of flexibility in delivery. The program can be taken individually in-house, or in groups with a facilitator. "The end users are extremely receptive, advising us that they would never have done server training if it hadn't been made so accessible and so low in cost."

D. DESCRIPTION OF MARKET

◆ Permanent licences: There are over 16,000 licensed establishments in Ontario and approximately 100,000 beverage servers.

◆ Special occasion permits: 150 of the 200 municipalities in Ontario require people obtaining special occasion permits to take SMART SERVE training.

◆ Community colleges (and their distributed campuses) offering the program as part of hospitality training or continuing education programs.

◆ Other educational institutions (for example, Toronto School of Business) offer the program.

◆ Other provinces have expressed an interest in using SMART SERVE. Some modification would be required to reflect province-specific liquor laws. Because of the modular format, customizing the program for various jurisdictions would be possible.

As of June 1999, Smart Serve sold 7,725 training kits and 192,120 certification kits. The program is being used extensively. In just over four years, over 133,000 people have received their Smart Serve Certificate. (In comparison, the former program certified 72,000 people from 1989 to April 1995.)

E. RESPONSIBILITIES AND FUNDING

Analysis of learner profile and needs

A front-end needs analysis was carried out by DVS Communication at a cost of $30,000. The contract was issued by Hospitality Industry Training Organization of Ontario with funding provided by the government of Ontario.

Production of the learnware

The contract with DVS to produce the learnware was for $350,000. The contract was issued by Hospitality Industry Training Organization of Ontario (now known as Smart Serve Ontario) with funding provided by the government of Ontario. Production of the learnware began in the spring of 1994, and the product was released in March 1995.

DVS carried out the following activities:

◆ instructional design of the learnware;

◆ production of the learnware;

◆ evaluation of the learnware in development; and

◆ development of the facilitator's guide and workbook.

The course content was developed by Bruce Wilson & Associates under contract to DVS. Wilson reviewed existing material, incorporated what was suitable and developed new content. The Alcohol and Gaming Commission of Ontario (formerly the Liquor Licence Board of Ontario), a lawyer, a toxicologist and Constance Wrigley, former manager of Smart Serve Ontario, acted as content experts.

DVS produced the CD-I and Random Access produced the video, under contract to DVS.

Administration of learner testing

Learners fill out the 25-question multiple choice test that accompanies the kit and return it to Smart Serve Ontario. Smart Serve Ontario processes the tests and awards successful applicants a wallet-sized certificate. Records are retained in the database and replacements cards can be issued.

Evaluation of the learnware post-development

During the program development, a pre- and post-test evaluations showed an improvement in level of knowledge after taking the training. Smart Serve Ontario has plans to evaluate the learning program to establish that it is an effective learning tool.

Marketing/distributing

The distribution of the product is handled by Smart Serve Ontario. Its marketing efforts are supported by the promotional efforts of the AGCO and the insurance companies who want to see people receiving this training. The marketing is made easier because SMART SERVE is the only beverage server training program available, and some of the training is mandatory (see below). Individual learners who contact Smart Serve Ontario and wish to take the course are referred to the most appropriate source, using the Smart Serve Ontario database of course providers.

F. LINKS TO ACCREDITATION

The AGCO requires the new server training program for new licence applications, transfers, disciplinary cases, and catering and golf course endorsements.

Community colleges (and their distributed campuses) offer the program as part of hospitality training or continuing education programs. Smart Serve Ontario handles the certification for the SMART SERVE portion of the courses.

G. ON-GOING FUNDING

Revenues from the sales of the training program have covered the costs of the program. All revenue is being put back into development of the program (see below).

H. LONG-TERM PLANS

Smart Serve Ontario's long-term plans for the program include:

◆ updating and revising the program, as and when necessary;

◆ producing Chinese- and French-language versions;

◆ adding additional modules to the program for employees of stadiums and casinos, and for special-occasion permit events;

◆ producing a CD-ROM version;

◆ selling the program to other jurisdictions (with modifications); and

◆ providing on-line Internet training.

There is a possibility that Smart Serve Ontario could become a delivery agent for other related training programs.

I. ASSESSMENT OF PROJECT

The critical success factors for this project were:

◆ keeping the purchase price down by operating on a shoestring budget; and

◆ presenting the material in a way that it had credibility for the end user.

The material was presented "with a velvet hammer," an approach appreciated by the target audience.

Program recognition is on the rise. The Municipal Alcohol Policy, in place in many municipalities in Ontario, requires that anyone holding an event on his/her property must have the volunteers and staff trained by the Smart Serve Responsible Alcohol Beverage Service Training Program.

Some challenges still exist: to appeal to all ages, and levels of education and experience; to keep the program easy to use, and understood by a broad audience; and to keep the program affordable and acceptable to all.

Smart Serve Ontario emphasizes the importance of working with the right company to develop the product. The developer should have a proven track record, including hands-on experience in using the authoring tools. Instructional design is extremely important, as is the creative approach, which will have a lot to do with the end user's acceptance of the learnware. The developer should provide options for creative approach. The way that the learning program is going to engage the learner should be mapped out from day one. Most importantly, the developer should have a good and practical understanding of the broad nature of the hospitality industry, its employees and customers.

Case Study 9:

TEXTILES HUMAN RESOURCES COUNCIL

A. DESCRIPTION OF THE LEARNING PRODUCT/SERVICES

The Textiles Human Resources Council, established in 1994, is a non-profit, union-management partnership with a mandate to develop world-class training and education programs for the Canadian textile industry's employees and managers. A Board of Directors comprised of industry CEO's and labour leaders governs the Council. The Council's membership has grown from a dozen firms in 1994 to well over 90 companies and organizations. The Council offers a variety of services and operates several programs, all intended to advance the skills of the industry's work force. In 1998, during the course of extensive consultations with the Canadian textile industry, an urgent need was identified for the delivery of workplace training using computer-based training (CBT) technology as the presentation method, employing CD-ROM and Web-based training (WBT) as the distribution modes. Recently, the Council launched a technology-based bilingual training program named Textile Training Through Technology. The program has three initial CBT programs in the developmental phase: The Manufacturing of Yarn; The Weaving Process, Dyeing and Finishing; and The Knitting Process, Dyeing and Finishing.

B. IDENTIFICATION OF LEARNING NEED

In 1996, Pricewaterhouse undertook an analysis of the human resource needs of the Canadian textile industry. The study highlighted a number of priorities for the industry to address immediately, including the need to develop current tools to support the recruitment and training of employees, and to explore alternative training delivery mechanisms.

As a result, in 1998, the Council commissioned *The Learning Technologies Survey*, undertaken by Lyndsay Green & Associates. The survey assessed how the Council's training programs could best be designed for workplace delivery using technologies such as CD-ROM, computer-based multimedia programs and the Internet. Based on the research findings, the Council began its development of the Textile Training Through Technology interactive multimedia programs. The content of these programs has been derived from two principal sources:

◆ Textile Management Internship Program (TMIP) technical term curriculum; and

◆ the content of a proven in-class basic textiles training program developed by Hafner Inc., a Council member.

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The TMIP is an intensive 12-month educational program designed to create future managers and professionals for the Canadian textile industry and, at the same time, permit young science, technology and engineering graduates to bridge the gap between their post-secondary education and long-term career employment.

The Council's union, management and supplier members took a lead role in the design of the program including curriculum verification, selection of the candidates, and providing paid jobs for the work placement or cooperative term. The TMIP produces graduates for entry-level professional positions in the Canadian textile industry, such as quality assurance, industrial sales, merchandising, process engineering, production supervision, process analysts, textile technologists, and research and business development. The TMIP is the only English-language textile manufacturing and technology education program of any kind in Canada.

The program consists of three consecutive four-month terms in textile technology, paid work placement, and managerial skills. Four institutions worked in partnership with the textile industry to design and deliver this program. The Textiles Human Resources Council, with financial assistance from Human Resources Development Canada under their Youth Initiative Program, developed and set the parameters of the program. Mohawk College and McMaster University deliver the textile technology and managerial skills terms respectively. The College of Textiles at North Carolina State University, one of the world's foremost textile educational institutions, worked with the Council to develop 10 of the 13 textile technology term modules. The TMIP students also attend an intensive one-week, hands-on lab at the end of the textile technology term at the College of Textiles' $300-million state-of-the-art facility in Raleigh, North Carolina. The CÉGEP de Sainte-Hyacinthe, which has a long history of textile education in Quebec, provided an instructor for the program, and provided advice with respect to the textile technology curriculum.

The other content provider, Hafner Inc., is a dynamic, forward-looking firm with a visionary management team. They have developed a comprehensive introductory training program, aimed at all company employees. The program was being offered on-site in a traditional, instructor-led classroom environment. Over 100 employees in Hafner's firm had completed the program that takes the learner through a progressively more detailed level of training covering the company's specific processes and products. This in-class training program was well planned and organized, and instructors and trainee manuals had been produced to facilitate the training experience. Most importantly, however, the training program was refined over time and its effectiveness was measured and documented.

Seven project management phases are being used in the design and developmental of the Council's *Textiles Training Through Technology* CBT programs: 1) assessment, 2) design, 3) development, 4) pilot implementation, 5) evaluation, 6) refinement, and 7) implementation.

The content is organized in modules, each representing a different production and process level. The core content is standardized and

applicable to the majority of yarn manufacturers, knitting, weaving and dyeing/finishing textile processes. The design and structure of the core content is such that it can be adapted to reflect distinct methods and equipment of individual textile firms, including proprietary processes and products.

Thirty Council members, firms and unions, as well as educational partners and multimedia companies, are participating in the beta testing of these initial Textile Training Through Technology CBT programs. Their suggested enhancements and participation of other major firms in the industry such as Cavalier Textiles, Consultex and Paris Star will ensure that the CBT programs will appeal to the entire Canadian textile industry, suppliers and related stakeholders.

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE TO MEET THIS NEED

In 1998, the Council commissioned *The Learning Technologies Survey*, carried out by Lyndsay Green & Associates. The survey found that the majority of the companies expressed a strong interest in receiving technical textile training in computer-based multimedia format, with everyone stating interest in one or more of the Textile Management Internship Program's 13 textile technology modules.

According to the survey, companies considered the strongest benefit of computer-based training to be the flexibility to fit training into the operations schedule. The training could be offered in slow production periods, during an employee's "off-shift" or when a line is down for technical reasons. Other perceived benefits included:

◆ the potential for trainees to proceed at their own pace and repeat the material as often as needed;

◆ a capacity for highly visual instruction (low reliance on text);

◆ the capacity to provide training in varying degrees of complexity and mastery (from simple to advanced); and

◆ the potential for providing other language versions.

Computer-based training would also allow companies to provide standardized content — ensuring that people on different shifts all received the same training — and would allow them to offer individual learning for people uncomfortable with a classroom environment. For one company, computer-based training could help meet the training needs of a hearing impaired employee.

One area of concern addressed in the survey is the requirement for customization. It has been the Council's experience that each company's process is so product-specific that generic training products need to be modified for every company. While the survey found some variation in company requirements, not all would necessitate customization. In some cases, companies were interested in only some of the modules, for example, the dyeing of fabric and yarn, but not carpet. In other cases, interviewees indicated the depth of information they would require, for example, basic or intermediate. The report concluded that these needs could be satisfied by the production of a comprehensive program that

allowed the user to select certain topics at given levels of detail. However, customization would be a requirement if a company wanted to cover a certain process that was too unique to be included in the generic training program.

Limited access to appropriate technology did not appear to be a barrier to implementing computer-based training. It is important to note that, although all the interviewees wanted to see computer-based delivery, almost everyone recommended that it be combined with some form of group support. They gave two main reasons for stressing the need for supplementary support: their employees would neither be familiar nor comfortable with a purely self-directed learning approach; and they wanted to build in a way for employees to interact with the instructors and the material.

D. DESCRIPTION OF MARKET

The Canadian textile industry has transformed itself into a highly dynamic, capital intensive and internationally competitive sector. Industry sales in 1998 were almost $10 billion, making up three percent of Canada's manufacturing GDP. Exports, too, are at record levels, having increased 275 percent in the last ten years. The industry in recent years has performed at record levels. Despite rapid productivity growth, direct employment has remained steady at roughly 54,000 workers. The industry is also a leading employer of women and minorities, primarily in non-metropolitan communities such as Granby, Gowansville, QC, Bridgetown, NS, and Arthur, ON, and textile firms now supply over 150 other industries including apparel, home furnishings, engineering, construction and transportation.

However, as Canadian textile firms seek to expand their international and domestic markets, there will be increased demand for a highly skilled workforce, both to adopt the latest high-tech environment and to retain the industry's competitive edge globally. Consequently, these initial CBT programs have the capacity to become the foundation on which the Canadian textile industry can construct its future training and education programs.

The universality of the core content, the efficiency of design and the ability to customize to suit specific requirements will be an attractive marketing feature in promoting the program to textile firms. The customized product will be made available to individual firms at a much lower cost (to be determined during the pilot phase) than if they undertook to develop this training independently.

E. RESPONSIBILITIES AND FUNDING

Human Resources Development Canada, by way of the Textile Management Internship Program, provided some of the funding support for the production of the *Textile Training Through Technology* program. Hafner, Inc. and numerous Council members have contributed to the content of this CBT program. In addition, a number of textile companies are donating their principal employees' time and resources to assess the prototypes.

F. LINKS TO ACCREDITATION

At this point there is no intention to link the individual multimedia training programs with an accreditation process if an individual company uses them on a stand-alone basis. However, when these CBT programs are used within the Textile Management Internship Program they will be accredited.

G. ON-GOING COSTS/FUNDING

Companies and organizations will be offered the CBT training programs at a price to be determined by the Board of Directors of the Textiles Human Resources Council. Any company wanting to customize a program will independently finance the customization.

H. LONG-TERM PLANS

In the fall of 1999, five of the Council's member companies will pilot the CBT programs. The pilot project will serve the following purposes:

◆ to analyze and evaluate the CD-ROM and WBT distribution methods, including synchronous and asynchronous environments, support materials and trainers/coaches;

◆ to evaluate proof of company buy-in at all levels;

◆ to determine potential return on investment;

◆ to decipher the selling price of the completed CBT programs and ascertain technological limitations and rate of change;

◆ to determine if learning technologies are the proper intervention to improve human resources performance in the workplace;

◆ to explore the ethics of implementing new technology for company learning; and

◆ to maximize success by minimizing risk.

I. ASSESSMENT OF PROJECT

The contribution of several vital project team members is critical to the developmental success of this CBT program. These team members include:

◆ the Council's Training/Education Committee;

◆ the Council's project manager and project administrator;

◆ textiles production and processes subject matter experts;

◆ textiles training subject matter experts;

◆ multimedia computer-based training and educational subject matter experts;

◆ instructional designers;

◆ visual and graphic artists, writers and production technicians and multimedia programmers;

◆ translators (the CBT is in both official languages);

◆ beta testers;

◆ Web designers and developers; and

◆ representatives of the Council's educational institutions.

Case Study 10:

VICOM MULTIMEDIA INC.

A. DESCRIPTION OF LEARNING PRODUCT/SERVICES

SAFE-T-Disc™ is a line of off-the-shelf and custom-developed products devoted to skills-based learning systems for industrial health and safety training. SAFE-T-Disc™ products are developed for specific sectors, such as construction, road building, home building, manufacturing and transportation. Currently there are three completed products. SAFE-T-Disc™ also provides custom modules that can be added to the off-the-shelf products for company- or site-specific information.

All SAFE-T-Disc™ products have comprehensive courseware content, developed with industry experts, designed to cover the necessary topics in each subject. All SAFE-T-Disc™ products are built with the same instructional design and user management system (UMS).

SAFE-T-Disc™ delivers courseware on CD-ROM to be run directly off the computer. The UMS provides a centralized database management system that can be administered on individual computers, over a network or over the Internet. The UMS tracks detailed results such as when the lessons were taken, how long a learner spent on the content, and how many test attempts were made before achieving the predetermined mastery level.

Companies purchase per-head learning contracts for the number of people they have to train. They receive courseware discs for the given number of learners and workstations and UMS discs for the given number of servers or workstations, if they are not running the Internet version.

The Construction Safety Training System (CSTS) is a SAFE-T-Disc™ product, developed with versions for Canadian and American marketplaces. It covers 49 topics using video and multimedia to ensure maximum learning. The Reading Machine ensures that lower-literacy or English-as-a-second-language learners will not be disadvantaged during the learning process. The program is completely self-paced, and typically takes three-and-a-half to five hours to complete.

B. IDENTIFICATION OF THE LEARNING NEED

Worker health and safety is becoming a top corporate priority, legislated by governments, enforced by courts, and insured with premiums based on risk. All the while, corporations are becoming increasingly cost conscious and driven by the bottom line.

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Technology-enabled training solutions are becoming the preferred approach, particularly when the content is performance based, and when the training is recurrent. Return-on-investment calculations are more easily applied in technical areas where concrete improvements can be justified and measured. SAFE-T-Disc™ has contributed to a measurable reduction in lost time claims. Research supports the advantage of having measurable effects of training.

Safety and health programs save an estimated $4 to $6 for every $1 invested. That's because injuries and illnesses decline, workers' compensation costs go down and medical costs decrease. There are other, less quantifiable benefits as well: reduced absenteeism, lower turnover, higher productivity and increased employee morale.

However, only 30 percent of US employers have established safety and health programs. Yet every year workplace injuries, illnesses and deaths cost the US $170 billion. Statistics are not currently available for the number of safety and health programs in Canada.

In the US, the incidence rate of injured workers (non-fatal) in the construction field is 9.3 per 100 full-time employees. Based on the estimated number of employees working in construction, that works out to more than 390,000 incidences per year. In Canada, lost time claims in the construction industry cost about $500 million each year. More construction workers die on the job than employees in any other field.

C. ASSESSMENT OF THE SUITABILITY OF LEARNWARE TO MEET THIS NEED

All SAFE-T-Disc™ products are built on the same tested and proven approach for instructional design and data management. SAFE-T-Disc™ has been validated by tens of thousands of clients across North America, and in two independent studies. The studies include a two-year Ph.D. project comparing classroom training to SAFE-T-Disc™, and a labor organization's field test of more than 500 workers.

Field tests have proven that learners are capable of achieving 100 percent mastery of subject material. This contrasts with conventional training styles that average 50 to 80 percent competency upon completion of course material. SAFE-T-Disc™ removes many barriers to adult learning. Training is focused on the individual. Learners can set their own pace through courseware based on their own skill level.

Learning material is presented, progress is monitored, responses are corrected, and skills are tested and validated to 100 percent mastery in less than half of the time required by traditional training. SAFE-T-Disc™ training can be delivered at the workplace. There are no travel costs or replacement worker costs to cover down time to attend courses.

SAFE-T-Disc™ courses use the full range of multimedia to ensure maximum learning. Created on CD-ROM, just-in-time learning can occur wherever and whenever it is needed. On the job site, in mobile trailers, in learning centres — there is no need to hire outside trainers or use in-house subject matter experts to train a handful of students in each location. The expert, the system, and the delivery method have been packaged together for maximum benefit.

SAFE-T-Disc™ tracks and documents employee training dates, completion times, content covered and results. The system provides the information required by health and safety administrators and insurance organizations. Most importantly, knowledgeable employees reduce costly incidences and accidents.

D. DESCRIPTION OF MARKET

Vicom's SAFE-T-Disc™ line of products is designed to provide safety training to the approximately 30 million people working in the blue collar aspects of construction, manufacturing, and transportation throughout North America — Vicom's target market.

For CSTS, SAFE-T-Disc™'s first product, the target market in Canada is the approximately 750,000 people who work in construction. The US market is the approximately 5.2 million people who work in construction. More than 40,000 people have been trained on CSTS throughout North America.

E. RESPONSIBILITIES AND FUNDING

Vicom developed the product in consultation with the Alberta Home Builders Association and the Alberta Construction Safety Association (ACSA) in Canada, and the American Society of Safety Engineers in the United States.

F. LINKS TO ACCREDITATION

CSTS-US covers 49 topics and covers material required by the US Occupational Safety and Health Administration ten-hour program certification.

CSTS-Canada covers 49 topics and provides comprehensive content that has been accepted as the training standard in Alberta, and which is being used in Saskatchewan and the Maritimes. In Alberta, the ACSA provides certification cards required to work on job sites throughout the province.

Vicom works with subject matter experts from industry when developing new products to ensure they are comprehensive and link to existing certification programs.

G. ON-GOING COSTS/FUNDING

Vicom is currently launching version 2 of CSTS into the US, and is working on customizing CSTS for other Canadian provinces. Furthermore, other industry groups representing sectors such as pipelining, manufacturing, and transportation have approached Vicom about building a SAFE-T-Disc™ product for their sectors.

Many associations and companies want to provide safety training for their employees or members but do not have the funding to do so. One option is for the Workers' Compensation Board (WCB) in each province to work with their industry sectors to provide the funding. This is what happened in Alberta: the WCB worked with the Roadbuilders and Heavy Construction Association to get the Roadbuilders Safety Training System. The benefit for the WCB is reduction in accidents and claims. In Alberta, 76,000 Alberta employers shared $57.5 million in rebates on their 1997 WCB premiums. Although training is only one part of the premium rebate, the ACSA and

large construction owners and companies think CSTS made a significant contribution to reduced lost time claims. CSTS is the training standard in Alberta.

With Vicom's new model, WCB can invest directly in training workers. The WCB also has the volume of workers to make an initiative cost effective. By signing a Learning Contract for numbers of employees to be trained, the WCB can provide SAFE-T-Disc™'s proven training directly to industry sectors. Furthermore, it is by having a proven safety standard across the province — and across Canada — that dramatic results will be seen.

H. LONG-TERM PLANS

Vicom Multimedia's goal is to partner with the WCB and industry associations to provide SAFE-T-Disc™ training to workers in key industry sectors. The long-term plan is to provide the best quality training for industrial workers with centralized record management over the Internet to simplify and streamline due diligence, recertification, safety training and management. The ultimate goal is to reduce accidents and the financial and human costs associated with them.

I. ASSESSMENT OF PROJECT

In September 1999, the Workers' Compensation Board (WCB) of Alberta released results from a study that evaluated the effectiveness of CSTS (the Construction Safety Training System) in reducing Lost Time Claims.

More than 30,000 workers have been trained in Alberta, since the Construction Owners Association launched CSTS as the mandatory training standard in 1997. The WCB study evaluated Lost Time Claim rates of more than 18,000 CSTS-trained workers over 2.5 years and compared their incident rates to the construction industry Lost Time Claim rates in general. Results showed a drop of 69 percent in Lost Time Claims in 1998 and an average drop of 75 percent for the CSTS-trained group versus the industry rate as a whole.

Safety training isn't a cost — it's really a hidden profit, according to Willis, one of the world's largest insurance brokers. "Preventing losses is the single most effective way for construction companies to improve profit margins," says Sherwood Kelly, Senior Vice President, Director Safety Management with Willis Corroon. And that profit can be achieved using CSTS, a SAFE-T-Disc™ product "The value of education is truly proven by the Vicom Multimedia system," says Kelly. "CSTS gives companies a valuable commodity: an employee who has knowledge and awareness about how to work safely," he says. "The management of 'risk' is where a contractor wins." Companies are already seeing the bottom-line benefits of safety training.

SAFE-T-Disc™ was evaluated at the University of Florida Rinker School of Building Construction in a two-year Ph.D. project comparing classroom training to SAFE-T-Disc™. The test results showed the following:

- ◆ "CD-ROM-based, self-paced learning offers distinct advantages over traditional, instructor-led classroom learning." (Dr. R. Cox and Dr. R. Issa, University of Florida, Rinker School of Building Construction, November 1997.)

- "Students exhibit superior retention rate when using SAFE-T-Disc™." (Cox and Issa.)

- "Students who tended to have lower scores in the classroom uniformly scored higher using SAFE-T-Disc™." (Cox and Issa.)

- Achievement effect: classroom-trained test scores increased by 35.1 percent, CD-ROM-trained test scores increased by 55.6 percent.

- Retention effect: retested three weeks after the initial training, CD-ROM-trained students showed a 13 percent increase over classroom trained students.

In May 1998, the Operating Engineers Training Institute in Manitoba conducted a field test of 500 workers with the following findings, as quoted from the study:

- "This program would cut costs substantially over the long run."

- "The benefits are enormous."

- "Response to the SAFE-T-Disc™ program has been twice what we had anticipated."

According to Tom Schuler, Associated General Contractors, Oregon: "This is the product I've been waiting for. It shows the potential of CD-ROM training."

Dieter Brunsch, VP Employer Services, WCB Alberta said, "Injury prevention is the surest way to bring down the cost of workers' compensation insurance."

Gary Wagar, Executive Director of ACSA says that although success cannot be isolated to CSTS alone, training has made a significant contribution to the ACSA and participating companies.